Rhythms in the Cosmos and in Human Beings How Does One Come to See in the Spiritual World?

Cosmic Workings in Earth and Man

Dr. Rudolf Steiner

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Foreword
By Frau Marie Steiner

This is the foreword to the publication of the lectures given by Dr. Rudolf Steiner to the Workmen at the Goetheanum, between August, 1922, and September, 1924.

These lectures are almost like conversations, for at Rudolf Steiner's own request their contents were always determined by the workmen themselves. They were allowed to choose the subjects and were encouraged by Rudolf Steiner to ask questions, to speak themselves and to bring forward their difficulties. Many different themes, remote and immediate, were touched upon. The special interest taken in therapy and hygiene showed how closely such questions were connected with the cares of the workmen's daily lives. All kinds of natural phenomena in the kingdoms of mineral, plant and animal were elucidated and this led on to study of the cosmos and the cosmic origins of created things. Finally the workmen themselves asked to be introduced to the principles of Spiritual Science and to the foundations necessary for understanding the deeper aspects of Christianity.

This common work developed out of study-courses at first conducted by Dr. Roman Boos for any of the workmen who were interested, after their daily tasks on the site of the building; later on, courses were continued by other members of the Anthroposophical Society. But then the workmen asked

Rudolf Steiner whether he would not himself help them to satisfy their desire for knowledge — also whether it would be possible to devote to this purpose a working hour when they were fresher and better able to assimilate what they heard. The lectures were then given in the morning. Apart from the workmen, only one or two people employed in the office and two or three close co-workers of Dr. Steiner were allowed to attend. Practical activities were also studied — for example, bee-keeping. The texts of the nine lectures on bees were subsequently published by the Agricultural Experimental Circle at the Goetheanum for its members.

But very many others now felt a wish to know the contents of these lectures. They had, however, been given to an audience of a very special kind, always quite extempore — just as the particular circumstances and the mood of the workmen demanded — with never a thought of publication. But to do anything in the way of editing which might take away their spontaneity and directness would be the greatest pity; they would lose the atmosphere arising from the interplay between the souls of the questioners and the answerer. Nobody would want to deprive them of vividness by making pedantic changes in the structure of the sentences. We have therefore tried to leave them as far as possible untouched. Even if the text does not everywhere conform with accepted standards of literary style, it has freshness, vitality, life.

1. The Circulation of Fluids in the Earth

DR. STEINER: I should like to speak of various matters to-day which can show you once more how the earth is connected with the whole universe — in which, as you know, it exists as a spherical body. From this aspect, then, let us consider the rivers and oceans.

You are aware that only a part of the earth's surface is solid land; for the most part the earth is a water-sphere, an ocean. And of the rivers it may be said that they have their source — they rise, as one says — somewhere on the earth and then make their way to the sea.

Let us take the Danube, for instance. You know that the Danube rises in the Black Forest. Or take the Rhine which rises in the Southern Alps. The Danube flows through various valleys into the Black Sea; the Rhine flows through various valleys into the North Sea. Now when we think of rivers and seas we generally only consider their course and where they flow out into the sea. Rivers give us a good deal of pleasure but we do not reflect on the great significance that rivers and oceans really have for the whole life of the earth.

We have as a rule more knowledge about the fluids in the human body. Man, as I have told you, consists for the most part of a volume of fluid, with the blood as a special kind of fluidity running through its veins. We also know that this

flowing blood is of the greatest significance for life; it forms life, it maintains life. As physical men we are entirely dependent on the blood flowing rightly through the body and, moreover, taking a definite course. Were it to deviate from this course we should not be able to live. The fact that the arrangement of rivers and seas has just as great a significance for the earth is generally not considered at all. It is not usually realised that water actually forms the blood circulation of the earth. Why is this not realised as a rule?

Well, you see, the blood makes a more striking impression. It is red, it contains all sorts of substances and people say to themselves that blood is in fact a peculiar substance. As to water, one simply thinks — Oh, well, it's just water! It makes less impression and the substances which it contains in addition to hydrogen and oxygen, are not present to the same extent as, for instance, the iron in the blood. So people don't consider the matter again. Nevertheless it is true that the entire water-circulation is of immense importance for the life of the earth. Just as little as the human organism could live without a circulation of blood, could the earth exist if it had no circulation of water.

The water-circulation has a distinct character — namely, it takes its start from something that is quite different from that into which it enters when it finds its outlet in the ocean. If you follow up the rivers you find that they contain no salt: the

water in the rivers is fresh water. The sea contains salt and all that the sea brings to maturity is founded on this salt-content. That is of extraordinary importance: water begins to circulate on the earth in a fresh, salt-free condition and ends in the ocean in a salty condition.

The subject is generally dismissed by the statement that such a river as the Rhine rises somewhere or other, takes this course (*a sketch was made*) and then flows into the sea. That in fact is just what is seen externally. But what is not considered is that whereas the river, the Rhine, for example, flows externally like this from the Southern Alps to the North Sea, there is a kind of stream of force under the earth, returning from the mouth of the river to its source. And what happens *there* (above the earth) is that the river is fresh water, contains no salt; what returns *there* (under the earth) is all the time carrying salt into the earth in the direction of the river. The earth acquires salts which actually come out of the sea. It would have no salt if the stream of salt did not return under the earth from the river's mouth to its source. The so-called geology which investigates the interior of the earth should always bear in mind that wherever there are river-beds, somewhat deeper in the ground there are deposits of salt.

Now, if there were no salt-deposits in the earth, no plant-roots would grow. For plant-roots only grow in the soil by

obtaining the salt for nourishment. The plant is most salty in the root, above it gets less and less salty and the blossom has little salt. And if one asks whence it comes that the ground can bring forth plants, it must be replied: because it has a water-circulation. Just as in us the blood arteries go out from the heart and the veins return, bringing back the blue blood, so in the earth the arteries of rivers and streams branch out on the one hand, while below the earth the veins of salt return. Thus there is a genuine circulation.

Is there then some special reason for the fact that the earth consists on the one hand of a fluid salt-body, on the other hand of dry land, and that salt is continuously brought in from the sea while there is none in the fresh water rivers that course through the land?

Yes, you see, if one really investigates sea-water, one discovers that this salty sea-water stands in but slight connection with the universe. Just as with us, for example, the stomach is but slightly connected with the outer world — in fact, merely through what it receives — so there is very little connection between the interior of the sea and the heavens. Land, on the contrary, has a strong connection with the heavens — land through which the rivers flow, where plants are brought forth through the salty deposits, particularly, however, where there are flowing waters.

If we view the matter in this way then we approach the mountain springs in quite a different spirit! We delight in the rippling of the springs, in their beautiful flow, their wonderfully clear waters and so on. Yes, but that is not the only thing! Springs are in fact the eyes of the earth! The earth does not see out into the universe through the sea, because the sea is salt and that gives it an interior character like our stomach. The springs with their fresh water are open to the universe, just as our eyes look freely out into space. We can say therefore that in countries where there are springs, the earth looks far out into the universe; the springs are the earth's sense organs, whereas in the salt ocean we have more the earth's lower body, its bowels. It is naturally not the same as in the human body; there are not such enclosed organs, organs that can be delineated. It would be possible to sketch them, but they are not so evident. However, the earth has its bowels in the sea and its sense organs in the land. And everything through which the earth stands in connection with the cosmos comes from fresh water, everything through which the earth has its intestinal character comes from salt water.

Now I will furnish you with a proof that this is so. I once told you that the reproductive process in man and animal also stands in connection with the heavens. I said that it is not merely a development of the egg in the maternal body, but that forces from the universe work in upon it and bring about its roundness. We see the movement of the universe outside

us as *round*, and thus this little egg is an image of the universe, because the forces work in upon it from all sides. And so where the reproductive process is at work, the heavenly is actually working into the earthly. You see the same thing in the eye, it is a sphere. I described the eye recently and how it is formed from the universe inwards. Sense organs and the eye are built in from the universe. If you observe the spleen you see that it is not spherical, it is formed more by terrestrial forces, the intestinal forces of the earth. That is just the difference.

If one only pays real attention to things then they give one proofs. I will presently give you a proof taken from sea and land, but first I will interpolate something else. I have told you that recently we have been making researches in our biological laboratory on the importance of the spleen. When we cannot eat regularly — we all eat more or less irregularly — the spleen is there to balance it all out: it is the regulator. We have produced the proof of this in our laboratory and there is a little booklet by Frau Kolisko (Not published in English.) which describes it all. While this experiment was being made we were obliged by the requirements of modern science to produce a palpable and evident proof. (This will no longer be necessary when science accepts super-sensible proofs, but it is still necessary to-day.) So we took a rabbit and removed the spleen and let the rabbit go on living without its being harmed in any way. This operation can be done with all

care, and it was a complete success. Later the rabbit died from an accidental chill in no way connected with the operation. Then we dissected the body and were anxious to see the effect of the removal of the spleen. The interesting thing is … now, what must be said by Spiritual Science? What remains when one has cut out the physical spleen? Well, now, if the spleen is here (*a sketch was made*) and one cuts it out, removes it, on this spot there still remains the etheric body of the spleen and its astral body. The spleen is given its form by the earth which has developed it. If one removes the physical spleen, leaving the etheric spleen, as was the case with the rabbit, what must happen? The following should happen. Whereas the physical spleen is dependent on the earth, inclines to the earth, the etheric spleen, which has now become free and is no longer hampered by the physical spleen, must come again under the influence of the heavens. And lo and behold, when we dissected the rabbit there was a small, round body, formed of fine white tissue! Thus there was complete confirmation. Something appeared which according to the expectation of Spiritual Science ought to appear. In a relatively short time a small webbed body about the size of a nut had arisen. Therefore you see that one only has to go to work in the right way and one finds proofs everywhere for the statements of Spiritual Science. You can gather from this that pronouncements made out of spiritual knowledge can enter quite concretely into the physical realm, if right methods are pursued.

Now just as the white body was formed here through the surrounding influences, so are the rudiments of man and animal formed spherically in the ovum through the influence of the heavens.

This knowledge makes us realise that fish are in a special situation, for they never actually come on to the land. They can at most gasp a little on land, but they cannot live on land, they must live in the sea. Hence fish are organised in a particular way; they do not come where the earth is open to the universe. It is therefore with great difficulty that fish develop sense organs and in particular the organs of reproduction, for the formation of these is dependent on the influence of the cosmos. Fish must make careful use of whatever light and warmth falls into the sea from without in order that they may breed and develop sense organs. But nature, as we know, attends to many things. You see it with the so-called goldfish: they use their whole skin for receiving the influence of the light and hence they become so golden. Fish take every opportunity of snapping up what falls into the water from the universe. They must lay their eggs wherever some light can enter, so that they may be hatched from outside. Thus fish are organised, as it were, to live under the water; they do not come out of the water.

What I am saying does not apply so very much to freshwater fish — fresh water can be penetrated from the

universe — but it applies very much to sea fish. And these show that they are organised to make use of all that enters the salt water from the universe in order to be able to breed.

The salmon, however, forms a quite remarkable exception. It has in fact an extraordinary organisation. It must live in the sea in order to develop proper muscles and to give its muscles right nourishment it needs the earth-forces found primarily in the salt of the sea. But when the salmon lives in the sea it cannot breed. Its organism shuts it off completely from the universe and salmon would have long ago died out if they had had to breed in the sea. The salmon is an exception; whereas it becomes strong in the sea and develops its muscles, it is practically blind and it cannot reproduce its species there. The reproductive organs and sense organs get weak and stunted; on the other hand, salmon in the sea get fat. Now in order not to die out — we can see this by the salmon here in the North Sea — they make a journey every year up into the Rhine, and so get the name of “Rhine salmon.” But the Rhine makes the salmon thin, it loses its muscles again; the fat it gained in the salt ocean it loses in the Rhine. Yet in the Rhine the salmon can breed, for while it gets slender, the sense organs and in particular the reproductive organs, in both male and female, become well developed. Thus every year the salmon must journey from the salt ocean to the freshwater Rhine in order to breed. Then while the old are still alive and the young ones are there, they all make the

journey back again to the sea in order to get rid of their slimness and regain their fat.

You see how this is all in full accord. Where the earth is salty the earth forces are at work upon the organs that are developed by the earth. Our own muscles are developed by the earth when we move with the forces of gravity. Gravity is the earth-force and works upon everything muscular, everything bony. The earth shares its salt with us and we get strong bones and muscles. With this salt excretion of the earth, however, we could do nothing for our senses and the reproductive organs; they would wither away. These must always come under the influence of extraterrestrial forces, the forces coming from the heavens. And the salmon shows what a distinction it makes between fresh and salt water. It goes into salt water to take up earth forces and get fat.

Thus the earth can be said to have a kind of circulation with respect to animal-life as well, as for instance, in the case of salmon.

This circulation drives the salmon alternately into the sea and into the river. They go to and fro, to and fro. The whole salmon community goes to and fro. One can see so clearly from the salmon how everything alive on the earth is in movement.

If we have learnt this from the salmon, it gives us the

picture of something else, something that is always before our eyes and is such a wonderful spectacle: the birds of passage. They travel to and fro in the air, the salmon travels to and fro in the water. Salmon migration in the water is the same as bird migration in the air, except that salmon go to and fro between salt water and fresh water and the birds between the colder and warmer regions that they need. In order to come into the right earth-forces of warmth, birds must go to the south and there they develop their muscles. In order to have the forces of the heavens they must come into the purer air of the north; there they mature the reproductive organs. Such creatures need the whole earth. Only the higher animals, the mammals, and man, have become more independent of the earth, have emancipated themselves and reached a greater independence in their own organisation.

This, however, is only apparently the case. In reality we human beings are at the same time actually two people. We are still more — I have told you: physical man, etheric man, etc. But even in the physical man we are really two people, a right man and a left man. The right half of the body is vastly different from the left. I think the minority of you sitting here would be able to write with the left hand; we write with the right hand. But the part of the nervous system connected with speech is situated in the left half of the brain. There are strongly marked convolutions there but none in the corresponding place at the right side. In a left-handed person

this is reversed; those who are left-handed have the speech-organisation on the right — not the external organisation, but the internal, which arouses speech. In this respect man is extremely different on left and right. But this is so elsewhere too; the heart is situated more to the left, the stomach is on the left, the liver on the right. But even organs ostensibly symmetrical are not wholly so. Our lungs have (here) on the left two lobes, on the right, three. So the right side of man differs very much from the left side. What is the reason of this? Let us start from something very simple. We do not, as a rule, learn to write with the left hand but with the right hand. This is an activity which depends more on the etheric body. The physical body is heavier and is more developed on the left, the etheric body more on the right. The left forms two lobes; the right, being more active, brings more life into the lungs and forms three lobes. On the left, man is more physical, on the right, more etheric. [See Dr. Steiner's lectures entitled: *Anthroposophy, Psychosophy, Pneumatosophy*, found in *Wisdom of Man, of the Soul, and of the Spirit*] And so too with speech. For right-handed people more nourishment is required by the left part of the brain than the right. And so every possible arrangement is made for man to contain the earth-forces on the left, and more the etheric forces of the heavens on the right.

As our modern science is only willing to recognise matter, it is just material things about which it does not know very

much. In the education of children it has introduced the harmful practice of making children learn everything with the left and right hand equally. Well, but man is not in the least organised for that! If that practice is carried to excess, education will make people half insane, for the human body is organised to be more physical on the left and more etheric on the right. But what does modern science care about physical, etheric? Both are the same to the scientists — left man, right man. We must be able to penetrate these things through spiritual science if we are to know anything about them. So on the left, man is more earthly, and on the right if the word is not misunderstood — more heavenly, more cosmic.

Man has however already largely emancipated himself, as I have said. He develops this left-earthly element, this right-heavenly element in such a way as to be able to carry it about as physical man. It is no longer remarked that on the left he has a tendency to the earth and on the right to the heavens. But there are people who have a greater tendency to the earth and they generally lie on their left side for sleep. People lie on the right side either when they are tired of the left or when they occupy themselves with forces inclining more to the heavens. Such matters are naturally difficult to observe since all sorts of other things come into consideration. When a person lies on the right side it may only be because that is the dark part of the room — that too could be a reason. And although one is not by any means bound to find it so, yet on

the whole people tend to sleep on their left side, since that is the earth-side. But man has really emancipated himself from the earth and is independent in what he does. It can be observed however in the animal; one sees the secrets of the world everywhere revealed in a very remarkable way.

Imagine that the surface of the sea is here (*drawing on blackboard*); underneath is the salt sea-water with all sorts of substances in it. Now there are certain fish which are quite remarkably organised. They are organised with a very strong inclination to earth-forces, while other fish snatch eagerly at all the light and air that come into the water. They cannot breathe in the air as they have no lungs; they collapse and die in the air, but with their gills they snap at all the air and light coming into the water. But there is a fish called halibut in the larger variety and sole or plaice in the smaller variety which is very good for food. It has great nutritive value, more perhaps than any other fish, and this shows that it inclines to the earth, since foodstuffs come from the earth. The halibut sides with the earth, so to speak. So what may one expect from these fish? We may expect them to show by their habits that they side with the earth. And so they do; they lie down on one side and this becomes pale and white. And so thoroughly do they lie on the one side that the head is twisted round and the eyes are both placed on the other side. A sole looks like this from below (*sketch*); there it is quite flat and white, and on the other side, above, both the eyes are set and the head is turned

round, because the sole always lies on the left side. The left side produces the nourishment and is pale and white. The other side takes on colour from the heavens, etc., becomes bluish, brownish and the eyes and head are turned away from the food side. So the sole is quite lop-sided, it has all the organs on the one side while the other is flat and pale. The halibut really produces a great deal of nutritive substance because it inclines to the earth. Some become over 600 lb. in weight. Halibut therefore give a clear demonstration: they always lie on one side since it is the earth that attracts them. If a man could lie just as forcibly every night on his left side, his head would twist round and he too would always peer out from one side. But it does not get as far as this with man; he has emancipated himself, as I have said, and maintains his independence.

Still, even man can be affected. One may find, for example, a person with a remarkable complaint: he sees with the right eye, or at any rate sees with one eye somewhat better than with the other. If this is not inborn, one can generally discover by questioning that he lies on the other side for sleeping. The earth-forces are working on the side upon which one very frequently lies and the eye becomes somewhat weak-sighted. It is not affected so strongly as in the case of the halibut, but still slightly. The eye that is turned away from the earth becomes somewhat stronger. You see how remarkable these connections are. I have said that nature somewhere or other

shows us with what forces she is working. When one sees a sole — the smaller ones are to be seen in any fish market, the larger ones are in the ocean — one realises that the nutritive part can only be formed just where it is, it must be separate. If these fish need anything from the heavens they must always take on that direction and the reproductive organs can be developed. These fish go about it differently from the salmon; salmon migrate, they go from the North Sea to the Rhine in order to be able to breed. Soles always lie on the one side, so that the heavens work from the other side and in this way they can develop their senses and reproductive organs.

And the earth itself, what does the earth do Well, if there were only the salt sea, the earth would long ago have perished; it cannot exist by itself alone. There are not only the salt seas but the freshwater rivers and streams, and the freshwater receives from universal spaces the reproductive forces for the earth. The salt ocean can bring in nothing from the wide universe which will give the earth continuous refreshment. When you go to a spring and the wonderfully pure water is bubbling out, you will notice how green everything is near the spring, what a wonderful scent there is. All is so fresh. Yes, and what is so fresh there by the spring refreshes the whole living earth as well. The earth opens itself there as if through the eyes and sense organs to cosmic space. And one can observe how living creatures like the salmon and the sole make their way to where they can find

this. They have a kind of instinct to attach themselves to the earth. The salmon seeks the fresh waters direct, the sole turns to the light by so arranging its body. It cannot come to the springs, but the springs are where the earth turns to the light. The sole, the fish, must turn direct to the light with its own body.

These things are immensely instructive, because they show us what is still present in man, but cannot be so well observed since he has broken away from the earth. And if one is not observant of such things one has really no understanding of the whole life of the earth. Indeed, if we look at the ocean and observe the sole, we can realise: Yes, by means of the sole the ocean opens itself everywhere to the heavens! Soles are a proof that the sea is thirsty for the heavens, since its salty content turns away from the universe. One can say that soles express the thirst of the sea for light and air. And if we look at our own circulation, we too, in fact, have fine sense organs, the organs of touch, at the places where we are saltier, where the muscles are situated. Here too man makes himself open to the outer world, though not directly, as through the eyes. These places correspond as it were to the places where soles are to be found in the sea. Soles make themselves open to the heavens and this gives them an extraordinary acuteness. Just as we become skilful when we are able to make good use of our external organs of touch, so the sole becomes skilful through the sea, because it makes itself open to the

heavens. Look at what is underneath in the sea — it is heavy and clumsy. Soles, oh! they get terribly cunning, they become sly creatures just by turning away from the sea on one side. Although they turn to the earth-forces as well, they feel: the earth-forces are just for themselves. They accumulate nutritive material — up to about 600 lb. as I said — but soles have these fine sense organs through which they open themselves to the heavens. They eat other fish — smaller ones. But if a sole approached, the other fish would flee away from it on all sides as if from a spectre. For other fish consider it necessary to have eyes at the sides — a sole affects them exactly as if a human being were approaching. The fish would rapidly get away and soles would have nothing to eat if they were not cleverer than the others. But the other fish, those which have an eye at either side, are in fact not so clever as they do not turn so definitely to the heavens. A sole seeks out places where the sea has a sort of little shore in the shallower parts, and there it lies down. It bores into the ground with its flat body, uses its jaws to cover itself a little with sand and then whirls up sand, but so fine that a fish can swim through. Then come the fishes and crabs, do not notice the sole, and instantly when they have passed over, it snatches and snaps at them! The sole does it very cleverly indeed! But of course only a creature could do it which is linked in a close connection with the forces of the universe.

Such a creature then has developed its physical body on

one side and on the other side it develops especially powerfully the invisible etheric body. We can see just by such things that the forces of intelligence in us are not derived from earthly forces. Earthly forces makes us muscular, give us salts; forces from the heavens give us forces which are at the same time those of reproduction and of intelligence.

You see, a man in a certain way is actually a small earth-sphere. Man too consists, as I have often said, of about 90 per cent of water. Man too is a fish, for the solid part which is only 10 per cent, swims there in the water. We are really all of us fish, swimming in our own water. It is even admitted by science that in essentials we are a small ocean. And as the sea sends out rivers, so does our sea, our fluid body send out salt-free juices. We too have our freshwater streams. They lie outside the muscles and bones. On the other hand, within the muscles and bones we have the same salt deposits as the sea has. Our nourishment is actually in the bones and muscles. We are therefore, in this respect too, a small earth-sphere: we have our salt sea in us.

If the fluidity, the freshwater streams become too strong — which can easily occur in children if the milk is not rich enough in salts — then the child becomes rickety, gets the so-called “English sickness.” When a person gets too much salt he becomes too much a sea, his bones become brittle and the muscles unwieldy and clumsy. There must always be a

balance between our salt consumption and what is contained in other foods.

Now what is it that lies in other foodstuffs? Look at a plant: you know now that plants grow because there are salt streams under the earth, returning from the river-mouth, which spread out and make the plants grow. So the plant finds its salt within the earth, but when it emerges from the earth it goes on growing towards the blossoms. The blossom becomes beautifully coloured because it takes up the light. There in the blossom the plant absorbs the light, in the root it absorbs the salt. There outside it becomes a light-bearer, there beneath it becomes a salt-bearer. Down below it is like the sea-part of the earth, up above it is like the heavens. The root is rich in salt, the blossom rich in light. In earlier times this was much better known and what is in the blossom was called “Phosphor.” To-day when everything is materialistic, phosphor is only a solid body. Phos = light, phor = bearer, phosphor = light-bearer; phosphor was actually that in the blossom which carried the light. The mineral “phosphorus” has received its name because of the way it gives out light when it is ignited. But the real light-bearer is the plant- blossom. The plant-blossom is phosphorus. Therefore for those organs in our human body, which as it were contain the freshwater currents, we need light; for the muscles, the bones, for that in us which ought to become salty we need precisely salt and solid ingredients in our food. Between them there must be the right

balance — each must be consumed in the right quantity.

And so it is too with the earth. However far you may have travelled you will not have seen — nor has the globe-trotter, nor the genuine world traveller anywhere seen that the earth has prepared itself a meal! But nevertheless it does nourish itself, substances are continuously being exchanged, the earthly element is ascending all the time through mist and fog. And you know that the rain-water which falls is distilled; it is pure water and contains nothing else. But the sea is nourished through the salt in rarefied condition from cosmic space. There is no need to keep to meal-times! It is only we men, who have broken away from the earth, who must procure our food from it. The earth is nourished by the fine substances to be found everywhere in the universe. It is fed continuously, but one does not notice it because it is such a fine and delicate process. You see, if you look at a man quite superficially, you do not notice that he is continually absorbing oxygen. So too with the earth, one does not notice that all the time it is receiving nourishment from cosmic space.

Now we human beings keep to our meal-times. There we take our nourishment, through the stomach into the lower body. This is quite obvious, extremely obvious. But in breathing it is less obvious. It is in respect of the obvious that social questions arise. One man is better off, another worse off. Men all want to be well off — social questions arise in

respect of the obvious. But social questions are not so clear in respect of the air which we all inhale. There it is not so easy to say that one man deprives another — there is a little truth in it, but not very much. In the case of our lower body we differ entirely from the earth. In the matter of breathing we are more like the earth, our breathing is performed almost unnoticed. But in fact we are all the time absorbing iron through our hearing — not only do we hear — we are absorbing iron in a very fine state. Through the eyes we absorb light and other substances too. This can be discovered from those people who are lacking in these substances. Through the nose in particular we take in an immense amount of substance without noticing it! With our lower body we have broken away from the earth and made ourselves free. So there we can only absorb foodstuffs created by the earth, baked and made more solid. We can take in the air because it is in the cosmos, and with our head and the senses we do what the earth does. There we receive nourishment out of the universe in the same way as the earth itself. The head is not formed spherically without reason; it deals with the universe just as the earth does. Only down below gravity enters, there the human body is developed according to the earth; physical hands — this gravity draws downwards. Gravity has not such an influence on the head; that remains spherical. So there we must pass from the visible to the invisible. One must say: The soles would die in spite of feeding on fish and crabs — for they only eat these for the sake of the pale, flat under-body — if they

were not to take in what comes from the universe through having made themselves one-sided. These are the fine, the delicate connections through which one looks into the laws and secrets of the cosmos.

This is what Spiritual Science must call attention to again and again, namely, that one must learn to know the true laws, not through crude superficial observation but through fine and delicate perception.

2. Life of the Earth in the Past and the Future

(Questions were asked about Colours and Primeval Rock.)

DR. STEINER: I will first deal with the question about rock, as that can very well be brought into connection with the things we have been considering lately.

Now you know that when a building is put up on the earth, great attention has to be paid to the laws of weight, gravity and many others — the laws of elasticity, for instance, of which we shall speak presently.

Imagine that one builds a tower, a tower, let us say, like the one on Cologne Cathedral, or that one builds something like the Eiffel Tower. It is clear, of course, that it must be built in such a way that it does not fall. If one has accurate knowledge of the laws of gravity there is no need for the whole thing to fall down. Still, the highest towers on earth can only be built on a base, and if you carry upwards to a height about ten times the base — that is, one to ten, you can get the highest towers.

So with the ratio of one to ten the highest towers can be built — otherwise the motion of the earth, wind storms, etc., would make them fall.

But in addition one must take care that the towers are in

themselves somewhat elastic. The top always rocks to and fro slightly. Attention must be paid to what is called the force of gravity. The tower will always rock, but as soon as it rocks too violently it collapses. The Eiffel Tower rocks quite considerably at the summit. But care must be taken that it does not get thrown out of its base.

Now if you look at — let us say — a blade of wheat, you find at once that these laws are not observed at all. A blade of wheat is really nothing but a tower, yet it has a tiny base. A wheat blade with its tiny base goes up high aloft, and if we reckon out the ratio it is certainly not one to ten, which must always be used in mechanical building. The ratio is much more like one to four hundred, and in many cases one to five hundred.

By the mechanistic laws we use on earth, such a tower would quite definitely have to fall down. For when it is shaken by the wind its elasticity forces cannot be understood at all by the laws that a mechanist must obey.

If you tried to set up something else quite heavy on the Eiffel Tower, you would find that it simply could not be done! But at the top of *this* tower, this blade or stalk, there is still the ear, and it moves to and fro in the wind. That, you see, contradicts all the laws of the builders.

Now when one investigates the substances of which this

blade consists, one first finds wood, that is to say, one gets a woody substance which you all know as bast. You see it in trees. And next you find in it a real building material: silica, quartz, real silicic acid. But it is harder quartz than is found in the Alps, in granite, for instance, or gneiss. This quartz, then, forms a scaffolding.

Besides these it contains a fourth substance — water. Thus this mortar made from wood, bast, water and quartz enables the stalk to contradict all terrestrial laws. A blade of grass is also a tower built entirely of substances. It can be tossed in the wind, does not break, rights itself when the wind ceases or the weather is favourable and calmly stands upright again, as of course you know.

But forces such as these, forces which can build something like this out from the ground, are not to be found on earth, assuredly not. And if you ask: Well, where do they come from? — this answer must be given: The Eiffel Tower is dead, the blade of wheat is *alive*. But it does not get life from the earth, its life comes from the whole surrounding universe. [See *Fundamentals of Therapy*, by Rudolf Steiner and Dr. Ita Wegman. Chapter III, “The Phenomena of Life.”] On the Eiffel Tower, gravity works purely downwards, drawing it down. The blade, however, does not grow by supporting itself on what is below. If we build the Eiffel Tower we must lay one material upon another and what is beneath will always be the support

of what is above. With the blade this is not the case; the blade is in fact drawn out towards universal space.

So if you picture the earth (*a sketch was made on the blackboard*) and there the blades of wheat, then because the universe is filled by a very fine substance called *ether* which lives in the plant, [See *Etheric Formative Forces in Cosmos, Earth and Man*, by Dr. G. Wachsmuth.] the wheat blades are all drawn out towards the universe. But life does not come from the earth, it comes from cosmic spaces, and we can say: life simply comes out of the universe.

In the same way, when the egg is formed in the body of the mother (I have spoken of this before) this body only provides the substance. It is the whole cosmos that works upon the egg and gives it life. In all that lives, you see, the whole of universal space is working.

Now if you consider the plant, it grows, to begin with, under the earth. (*A sketch is made*.) If that is the earth, the plant is growing within it. But the earth is not some sort of neutral lump, it is really miraculous. It contains all sorts of substances, but three were of quite special importance in ancient times.

One of the three is a substance which we call *mica*. Only a small amount is to be found in plants to-day, but even so it is extraordinarily important. If you have already seen mica, you

can perhaps remember that it is formed of thin plates, so thin that they sometimes look transparent. And once upon a time the earth was interwoven by such little mica plates. They went in *this* direction (*sketch*). As long as the earth was soft, such forces were still in it. Opposing them were other forces: they went so (*sketch*) and thus there was a real grating of lattice-work in the earth. These other forces are to-day contained in *quartz*.

And in between is yet another substance — clay. This clay unites the two, it fills in the lattice-work, so to speak. As a rock it is called *feldspar*.

Thus at one time the earth was composed in the main of these three kinds of primeval rock. But it was all soft, like pulp. There was the mica, which was really at pains to have the earth formed of thin plates in a horizontal direction. Then there was the quartz, radiating in this direction, and then the feldspar cementing the two together.

We find these most essential constituents to-day when we take the clay soil that is everywhere in the fields. At one time they were all intermingled inside the earth, now they are to be found outside in the mountains. If we take a piece of granite, it is quite granular, simply composed of little scales. These scales are the thin places of mica broken into splinters. Then there are very hard grains in it — that is the quartz; and then

combining grains — the feldspar. These three bodies are broken down, made granular and are to be found outside in the mountains. They form the base of the hardest mountain ranges.

Thus since the earth was soft they have been pounded and broken to bits by all manner of forces which work in the earth. But remains of these old substances, particularly remains of their *forces*, are still to be found everywhere in the earth and the plants are built up from them by the universe.

We can say therefore that when they are working to-day out there in the mountains, they can create nothing more. These rocks are broken up, crumbled away, crushed into grains and are too hard to become plant. But since the plant always gives its essential substances and forces to the seed, what is within the earth can still be used for building up the plant out of the universe.

Such a view as this, where one takes into account how the whole of cosmic space works together to produce life, is not found at all in modern science. You may have read of the lecture recently delivered in Basle where an explanation was given of how life must actually have arisen on earth. The lecturer said: Yes, it is difficult to imagine that through mere intermixing or chemical combinations of substances, life comes about on earth. Then it must have come out of the

universe — but how?

Now it is interesting to see how a modern scientist pictures to himself the way in which life can have come out of the universe. He says to himself: Well now, if it is not on the earth it must have come from other stars. The nearest star which perhaps once threw off substances that then flew towards the earth is so far away that what was split off would take forty thousand years to reach the earth. One has to imagine that the earth was once a fiery-fluid body. There could be no life on it or else of course it would have been burnt up. But it cooled down and then it was able to absorb life if it had flown to it from the nearest star. Now one cannot imagine — said the lecturer — that a life germ, a little germ of life wandered for forty thousand years through cosmic space, especially as this has a coldness — not warmth — of minus 220 deg. C. This germ then would arrive at the earth and then life on earth would originate. Earlier, no matter how many germs had flown into it, they would have been burnt up. And when the earth had sufficiently cooled down they would have thriven. But this simply could not have come about, said the lecturer. Therefore we don’t know where life comes from!

But one can see quite clearly that life comes out of the universe. One sees in reality that in everything living, not only earth-forces are at work. We use only the forces of the earth for the Eiffel Tower and so on. But in such a tower as this

(blade of wheat) there work indeed not only the earth's forces but the forces of the whole universe. And when the earth was still soft, when mica, feldspar and quartz or silica, swam through each other in the fluid condition, then the whole earth was under cosmic influences; it was a giant plant. When you go out to the mountains to-day and find granite there, or gneiss — which differs from granite in being more rich in mica — they are the remains of this ancient giant plant. And just as when to-day the plant decays and gives over its mineral constituents to the earth, so, later on, the whole earth body as plant gave over its mineral constituents. And thus to-day you have the mountain ranges. For our hardest mountains originated from the plant nature, when the whole earth was a kind of plant.

I have already told you how the earth looked when this primeval rock had ceased to be in a plant condition, but all was still soft. Our present animals and men were not then in existence, but the Megatherion and all the creatures I described to you. But before all this came about, the earth was a giant plant in cosmic space. And if you observe a plant to-day and enlarge it, you find even now that it resembles the mountain formations outside. For the universe only acts on the plant as a whole; its minutest parts are already stone. Thus, briefly, the earth has once been alive and what we find to-day in the hardest mountain rocks is the remains of a *living* earth.

But the earth's solid, mineral matter has originated in yet another way. If you go out on the ocean you find island formations. Here is the sea (*sketch*) and at a certain depth under the sea there live tiny creatures in real colonies — the coral-insects or polyps. These coral polyps have the characteristic of continuously secreting chalk. The chalk remains there and the island is finally covered by their deposited chalk secretions. And then sometimes the ground sinks in *here*, is submerged and a lake is formed. There is a ring of chalk which the coral insects have left behind. Now the earth as a whole is continually sinking in the very regions where these polyps are depositing their chalk. They can only live in the sea itself, so they go down deeper and deeper, while the chalk is left behind up above.

Thus one can still find in the sea chalk deposits which are derived from living creatures, namely, the coral polyps. Formerly there was animal life where now in the Juras we find limestone or chalk. The limestone is the deposit of former animal life.

If you go into the central Alpine region where the hardest rocks are, there you have the deposited plants. If you go into the Juras, there you have what is deposited by animals. The whole earth has once been living; originally it was a plant, then an animal. What we have to-day as rock is the remains of *life*.

It is simply nonsense to imagine that life is built up from dead substances through chemical combination. Life comes out of the ether-filled universe. It is nonsense to say that dead substances could unite and come to life — what is called “original creation.” No, it is precisely the dead substances that are derived from the living, are deposited by the living. As our bones are separated out — in the mother’s body they are not there at first — so is everything, our bony structure, etc., formed out of the living. The living exists first and only afterwards comes the dead. The ether surrounds us and it draws everything upwards just as the earth’s gravity draws everything down. It draws upwards but it does not bring death, as gravity does. The more you inhale gravity, the more you become gouty or diabetic or something of the sort. To that extent we become dead. And the more the upward forces prevail in us, the more living we become.

HEALING FORCES IN HUMAN NATURE

I now come to a part of the question which Herr B. has asked. Let us imagine then that I have someone before me who is ill, and I can say to myself: What is wrong with him is that he has not enough of the forces that work outside in the universe. He has too much of the forces of gravity — everything imaginable is deposited in him. Now I remember! Yes, I say to myself, it was quartz, silica, that at one time let forces stream out into the universe. If I prepare silica in such a

way that the original forces become active again, that is, if I make a preparation from silica, mix it with other substances by which the silica element gets etheric force again and give this as a remedy, then I may be able to make a cure. Very good results can come from a silica preparation. And so in medicine one can make use again of forces which at one time existed in silica in living form. Great achievements in medicine can be secured if one reflects upon the condition of the earth when it was fully alive, when the silica was still under the influence of the universe.

Therefore when too little is *living* in a patient and he needs a connection with the universe, i.e. gives him substances which lie hardened outside and which one can very well employ as medicaments.

The head projects most of all into the cosmos, therefore it is most easily healed with silica; the abdomen tends most towards the earth, hence it is most easily healed with mica. And that which lies more in the centre — lungs, etc. — that one heals very well with feldspar when one prepares it in the right way.

So now you see that when one understands nature, one also really understands what are healing forces in human nature. But one must have a real feeling for the fact that the universe acts upon our earth.

Now it is always only possible to explain certain things at certain times. And so I can explain to you the flight of birds from another aspect than the one I took before, when we were not so advanced. Our modern science thinks very abstractly about the flight of birds in autumn and spring. In spring the birds leave their warmer haunts and in autumn, when it gets colder, they desert the more northerly regions. But there are birds which fly over the ocean in a south-easterly direction and they fly very fast and make no halt in between. One can prove this because it can be shown that there are no islands at all on the routes such birds sometimes take. Moreover they fly very high and it is not possible, on the lines of ordinary science, to answer the question: what do they breathe up there! For one could only think that so high up they would be stifled.

Nor can people make out how these birds find their direction. It is sometimes said: Oh, well, that is an inherited faculty; the young ones have always inherited it from the older ones, and the old birds instruct the young and then it works very well — the young ones can also do it. So when autumn comes, the older swallows organise a school, the young ones are instructed, the old ones fly in front, the young ones behind and copy them. This is what people have imagined.

But not all birds of passage do this. In the case of migratory birds in South Africa, for instance, when spring comes here

with us, the older birds fly away first and come back here. The young ones can hold out longer there because they are still strong. The old birds get away earlier from the dust and leave the young ones behind. They don't instruct them at all, don't act as guides; the young have to find their way quite alone.

Some people have said: Oh, well, birds see to a great distance. In fact if it is a case of Africa they would even have to see through the earth! One doesn't get very far with these things. But I will give you an example by which you can see how the matter really lies. There is something else about which one can wonder how it makes its way — namely, a ship. How does a ship find its direction if it is to sail from Europe to America? It takes its direction from the compass. When as yet there were no compasses it went rather badly with the ships; they had to find their direction from the stars. So they steer their course by the compass, that is to say, by forces which are invisible, which are present in the ether. These are the very forces by which the birds find their direction! Only we men have no longer a sense for these invisible forces. The birds, however, have a sense for them, they have an inner compass. What we only learn laboriously, by observing the etheric forces with compass, magnet, etc., a bird has within itself. It flies by the ether, by what is working in universal space.

And so we can say: the earth is everywhere surrounded by

ether and the ether contains *life-forces*. They come from the universe, take hold of earthly substances and from them bring about the living.

But something always remains within as *remains of life*. When, for instance, you take coral chalk, there is always something left that a little recalls life, something that has branched off from the living. So it is possible to find all sorts of things within it still, which can be administered as quite a good remedy.

And if, as I said, you take silica, which has already become terribly hard, and make use of it as a medicament, you can heal head ailments very effectively.

Thus life is still within it. The whole of it has once been alive. We cannot say that minerals are still living to-day, but they have lived once. They were once constituents of life. There is a remnant left in them which we can extract by all sorts of means and through which they can serve very well as remedies.

So this question as to *whether there is also life in stone* has been answered. If people only calculate with the forces acting on earth, then they proclaim that the earth looked different millions of years ago. They take no account in this of heavenly space. I said to you lately that if one takes into account what comes from the heavens one does not arrive at anything like

such vast numbers of years.

One discovers, however, that here in our regions everything was still frozen and covered with ice, while over in Asia there was already quite a high degree of civilisation with much wisdom spread among the inhabitants.

But one comes to see that in a certain way our earthly life depends on the life outside, the life in the universe. When one goes back six, seven, eight thousand years, the earth with its mineral rocks was quite different from what it is to-day; not so much externally, but internally quite different. And then one goes back farther and farther to the soft condition of the earth. If we want to direct ourselves by the cosmos, we must observe it in the right way.

Now one can observe the cosmos by observing the position of the sun's rising. At the present day the sun in spring rises on the morning of 21st March with the constellation of Pisces behind it. But if one goes farther back — for instance, into the times before the Birth of Christ, the sun rose, not in Pisces, but in the constellation of Aries. That means the vernal point has moved along. If the sun rises in spring on 21st March in Pisces, then about 2,160 years ago it rose in Aries, still earlier in Taurus, still earlier in Gemini. There are twelve such constellations.

Thus the rising position of the sun is always moving in a

backward direction; it moves round a whole circle, so that the vernal point goes quite round the earth. Is that understandable? It is always moving farther round from west to east.

One therefore arrives at the fact that formerly the sun rose in Aries, earlier in Taurus, still earlier in Gemini, then in Cancer, Leo, Virgo, then in Libra, in Scorpio, Sagittarius, Capricorn, Aquarius and then, as to-day, in Pisces. So when we go back 2,160 years it rose in Aries, another 2,160 years in Taurus, another 2,160 in Gemini, still another in Cancer, another in Leo. Then we come round again until at one time it was rising in Pisces. We come right round. (*Sketch*.) In 25,920 years the sun makes a revolution round the whole universe.

That is very interesting, and by such a course of the stars one can see how everything on earth changes. With the conditions brought by our present vernal point, we have our high mountains with the dead *granite masses*, containing feldspar, quartz and mica. It is all dried up, devastated. So it was, too, 25,920 years ago: similar conditions then prevailed on earth. But in between it was all different. For instance, the sun rose at one time in spring in Libra, between Virgo and Scorpio. Then the whole earth was alive, soft, was in fact a kind of plant. We need not go back more than 15,000 years at most, then through the quite different position of the sun the

earth had a plant nature, and later an animal nature. We should be able to follow from the sun's course how the influences coming in from cosmic space have altered conditions on the earth.

You must think to yourselves, as you go back in time: the rock in the primeval Alps which is quite hard and solid to-day begins to flow, somewhat as iron flows in an iron foundry. It is naturally not quite the same, for when we go back the flow is reversed, as it were, it is in process of becoming solid. And if we go forward into the future, we shall again have the sun in Libra — for now it rises in Pisces, after 2,160 years in Aquarius, then in Capricorn, Sagittarius and once more in Libra, the Scales. At this future time when the sun rises once more in the Scales, the whole primeval Alpine range will have dissolved. The dense quartzes will have become fluid again, the earth will once more be plant-like and men and animals return to the condition in which they formerly were. In the meanwhile, however, they have absorbed all that they could take in on the earth.

So everything really goes in a circle. We look back to an earlier time when the earth and its hardest formations were fluid. Then the cosmos above brought forth such creatures as I once described to you; they arose through the in-working of heavenly forces and died out. Then all cooled down, solid formations arose and gradually there came the life of to-day.

But it all goes back again. The granular quartz and granite, etc., are dissolved and former conditions return, but at a higher stage of evolution.

If you take in your hand a piece of granite containing quartz, you can say: This piece of granite with its quartz will at a future time be alive again. It has lived in former ages and to-day it is dead. It has formed solid ground upon which we can walk about. When we did not need to walk, the solid ground was not there. But one day it will come to life again.

In fact we can say that the earth sleeps as regards cosmic space — only the sleep is long, 15,000 years at least. When the earth was alive it was awake, it was in connection with the whole universe and the life forces of the universe brought forth upon it the great beasts. Later, as solidity was reached, these forces brought forth the human beings. Human beings nowadays have a pleasant time of it on earth — of course in regard to the universe too — they can go about on solid ground. But this solid ground will wake up again — it is really only asleep — it will wake up again and become active life.

If we take a piece of chalk, limestone, just an ordinary bit from the Juras, it is the remains of a portion of life. It is deposited from life, but someday it will be alive again, it is between life and life and is really only asleep.

Now we can use chalk, or calcium, very well as a medical

preparation when, for instance, we find that children cannot absorb proper nourishment. This is particularly the case in Germany to-day — it is dreadful there now. When I recently went to Stuttgart to inspect the Waldorf School again, I visited the first Class. We have twenty-eight children in this Class, of whom only nineteen were present, the others were all ill. In another Class, fifteen were ill. And when one goes into it one finds terrible conditions. They brought a little boy into my consulting room and asked: What is to be done with him? He can no longer eat and the doctor has given him up.

Through persistent undernourishment, the digestive organs gradually form the habit of not being able to digest and they refuse everything. People can no longer eat, no matter how much one gives them. You can give them Quaker meals (The Society of Friends supplied the Waldorf School with food gifts) and everything possible, but nothing can help the child because his organs have ceased to act. He looks rather fat and greyish-yellow. What is to be done? The organs must first be made fit again to take in nourishment. Here one is well served by the little bit of life that is in calcium. When calcium is rightly used as a remedy, one can reawaken these sleeping digestive forces so that the child can live. One must give a mixture of calcium with other substances as it does not work by itself alone; it must be made to pass over into the organism. The calcium is absorbed if it is given in 5 per cent dilution.

But what is one using in giving calcium in this dilution? One is using the forces which once, in earlier times, were life forces in the chalk. They are still in it and can be used to reawaken life. But if one uses calcium in high dilution, in homeopathic doses, as one says, not 5 per cent but 5/10,000 — not even 5 per 1,000 but 5/10,000 — this, mixed with the other substances, acts on the head. It immediately becomes a remedy for the head.

If one gives the calcium allopathically it acts on the digestive organs, but in a quite high dilution it acts on the head and one can vary one's treatment in this way. It is also possible to ask: what is one using in the high dilutions of calcium? Here one is using the forces *of the future* which are still in it and will come into existence again in future ages.

You see, we must know nature in this way and then it can give us remedies. For there was once life everywhere and will be so again; death only stands between two lives. From primeval rock it is possible to use both past and future life forces in the right way.

This makes us realise something else. We find in our modern world both allopaths and homeopaths. The allopaths cure allopathically and the homeopaths, homeopathically. Well, but as a matter of fact many illnesses cannot be cured homeopathically, many must be cured allopathically.

Remedies must be prepared differently. One cannot be a fanatic who swears by words, one must administer the remedies out of a full knowledge — sometimes so, sometimes so. Anthroposophy does not go in for catchwords — allopathic — homeopathic — but it studies the matter and says: the allopath works principally on the stomach, intestines, kidneys; there he is successful. Homeopathy is successful when the source of the illness is in the head, as in influenza. Many illnesses have their origin in the head. One must know how things really take their course in nature. People invent catchwords to-day as they no longer have real knowledge. Catchwords are always invented when things have ceased to be understood.

It is naturally not easy to arrive at the truth, for the allopath says: I have often cured such and such … and the homeopath says: I have often cured such and such. … Of course they always leave out the diseases they have not cured!

But take a man like Professor Virchow of Berlin, a doctor and professor who certainly could not be accused of not standing completely in modern medicine, who has even been called a genuine Liberal by the Free Thought Party. Yet with regard to cures he has been obliged to admit the following: “When a doctor in our modern medical world can show that he has cured one hundred people, the truth really is that fifty of these would have got well without him, and 20 per cent would

have recovered even if he had used quite different remedies. So 70 per cent of cures are not to be attributed to modern medicine — 30 per cent at most." This is what Virchow calculated and he stood fully within the world of modern medicine.

It can definitely be stated that the right remedy, rightly employed, is effective; everyone can convince himself of that. Quicksilver, for instance, although it has after-effects, is nevertheless efficacious. And so one must just find the right thing. Sometimes it is terribly complicated, sometimes the organism has even become too brittle to stand the cure. But in a certain sense, through a real knowledge of what exists in nature, we can see how the various substances work. As dead substances they are really only in the middle between two periods of life and we can see their effect on man. But it is essential to have a real knowledge concerning their life.

Now the peculiar thing is that if one wants to understand anything, one must always start from *life*. Even in regard to colours we must take our start from life.

Sometimes when one sees modern pictures one has the feeling that there is no flesh behind, but that wood has simply been smeared with colour. Modern painters are quite unable to reproduce the tint of flesh-colour, because they have no living feeling that flesh colour is created out of the *human*

being. Nowhere does it appear on any other material. One has to understand flesh colour and then the other colours can be understood. I will speak more about this on another occasion.

The child that they brought to me in the Waldorf School and who had been treated with calcium by the school doctor had completely lost the flesh colour and had become yellow from within outwards … let us hope that people don't say that a proper remedy was not used! Living activity is inherent in colour and we are therefore experimenting in using the less dead for colours. So when we painted the Goetheanum we used *plant colours* as they come more from the living. In colour too you must go to life.

You see, the question as to whether rocks also have life was not so foolish, in fact it is quite intelligent. It has given us the opportunity of considering how the rocks are alive in the course of the earth's evolution, become dead again, and so on, and how human life is related to this.

3. Nutrition

Protein, Fats, Carbohydrates, Salts

(Dr. Steiner asks if anyone has a question.
A question is asked about nutrition and about the potato as a foodstuff in Europe and elsewhere.)

DR. STEINER: We will think about the general question of nutrition and its relation to the spiritual world. As you know, it was not until the modern age that the potato was introduced as a foodstuff: I have told you that in earlier times people in Europe did not eat potatoes but food of quite a different kind. The subject cannot, of course, really be understood without studying the relation of the spiritual world to the whole process of nutrition.

You will remember that I once spoke to you of four substances upon which man's life essentially depends. Firstly, there is protein. Protein is a constituent of all food; it is found in its most characteristic form in the hen's egg, but it is present in all foodstuffs. Protein, then, is the first of these four essential substances.

Then there are the fats. Fats are consumed not only when the flesh of animals is eaten; all foodstuffs contain fat. Other substances, too, as you know, are transformed into fat-containing foodstuffs, for example, milk into cheese.

Carbohydrates are the third essential constituent of food. Carbohydrates come from the plant kingdom; they are of course present in other foodstuffs, too, but essentially in substances like wheat, rye, lentils, beans, potatoes — especially in potatoes.

Finally there are the salts. Salts are usually considered to be mere accessories but they play a particularly important part in man's life. The most common form, of course, is cooking salt, but all foodstuffs contain salts. It may therefore be said: In order that man may be able to live at all, his food must contain protein, fats, carbohydrates and salts.

I will now speak of how these different substances nourish the human being as constituents of the various kinds of foodstuffs. First of all we will think about the salts.

Even when salts are consumed in tiny quantities they not only add flavour but are an extremely important means of nourishment. We take salt with our food not only to make it tasty but really in order that we may be able to *think*. The salts that are contained in food must reach the brain if we are to be capable of thinking. If a person is so ill that all the salt in his food is deposited in the stomach or intestines and not carried by the blood into the brain, he becomes stupid, dull-witted. That is the point to which attention must be called.

We must of course be quite clear that the spirit is a reality, but if spirit is to be an active power on the earth, it must work in the earth's substances. In Spiritual Science, therefore, we must be able to perceive how the spirit works in the various substances. Otherwise it would be like saying: Oh, but we are spiritua1 people and machines are entirely material; we do not want anything material, therefore we shall not buy iron or steel but make machines entirely out of spirit. That, of course, is sheer nonsense! Substance is absolutely essential. The spirit working as the creative power in nature needs substance. And if spirit is prevented from making use of substance — for example, if salts are deposited in the stomach and intestines instead of reaching the brain by way of the blood — then a man becomes stupid and dull.

Needless to say, things are not as simple as all that. Man cannot derive nourishment from salt in the form in which it is present in external nature. If you were to make a tiny perforation in the brain and let salt trickle in, it would be quite useless. The salt must pass into the stomach and intestines and be brought into a finer and finer state of solution — even on the tongue it begins to dissolve. The result of what the human organism does with the salt is that it is already in a spiritualised condition when it reaches the brain. The process is by no means one of simply introducing salt into the brain — it is by no means as simple as that. But if a man's condition is such that the effects of salt cannot work in his brain, he

becomes dull and stupid.

Now let us think of the carbohydrates. When we eat peas, beans, wheat, rye or potatoes — above all potatoes — we consume carbohydrates. The carbohydrates have a great deal to do with shaping the human form. If our food contained no carbohydrates, all kinds of distortions would appear: malformations of the nose or the ears, for example. It is due to the carbohydrates that we bear the outward stamp of *man*. If a person's constitution is such that the carbohydrates are not carried into the brain but deposited in the intestines and stomach, we shall see him becoming shrivelled and feeble, as though incapable of holding himself erect. The carbohydrates, therefore, help to give the human form its proper shape.

You see, therefore, that it is important for us to get hold of the right kind of foodstuffs. The salts work mainly upon the front part of the brain, the carbohydrates farther back. A man who cannot thoroughly digest the carbohydrates, whose organism is incapable of carrying them into the proper area of the brain, will very soon become permanently hoarse and be unable to speak with a really clear voice. Therefore if you have in front of you someone who used to speak quite normally but has suddenly developed hoarseness, you may surmise that he has digestive trouble of some kind. He cannot thoroughly digest the carbohydrates; they do not reach the right area of the brain and the consequence is that something

goes wrong with his breathing and his speech. And so we may say: the salts work mainly upon thinking. The carbohydrates work, for example, upon *speaking* and the organic processes allied with it, and are an essential constituent of food. The carbohydrates help to give our human form its proper shape, but if left to themselves their tendency would be to make us into a mere form and leave it at that. They do not fill out the form — that is done by the fats. The carbohydrates have, so to speak, merely outlined the form and the fats provide the filling material. That is their function — to provide us with material substance. In fat itself, of course, this material has a definite character.

I have told you that the human being consists of an "I," an astral body, an etheric body and a physical body. Fat, needless to say, accumulates and is deposited in the physical body. But the all-important function of enabling the fat to be deposited and at the same time to remain *living* fat, is performed by the etheric body. Feeling and perception, however, depend upon the *astral body*.

When a man is awake, the astral body is within him; when he is asleep the astral body is outside. When he is awake and the astral body is working in the etheric body, fat is assimilated and absorbed all the time. Fat acts as a lubricant for the whole body. When a man is asleep and the astral body is outside him, fat is not assimilated but deposited. During

waking life, fat acts as a constant lubricant; during sleep, fat is deposited. And both are necessary: deposited fat and lubricating fat.

If someone passes his days in a kind of continuous sleep … such cases are less frequent now than they used to be, but think of some leisured gentleman who does no work at all. Fat is actually deposited during what is called his waking life — although it really amounts to sleep! Such a man grows very corpulent and fat accumulates all over his body. Healthy depositing of fat, therefore, depends upon proper assimilation and absorption, for fat is being produced inwardly all the time. A man who consumes just the quantity he can assimilate, keeps healthy; but if anyone goes on eating, eating, eating, and assimilates nothing, he will become corpulent, pot-bellied.

Country folk know these things by instinct. They know that when pigs are being fattened the life of these animals must be so arranged that their bodies are no longer lubricated and that everything they eat is deposited.

It may, of course, be impossible for fats to be properly deposited in the organism; if this is the case, a man is ill. In this respect a man of leisure is healthy. But another trouble may be that the carbohydrates are not deposited and then the voice gets hoarse. It may also be that the fats are not deposited in the right way but simply pass away in the faeces;

when this happens there is too little fat in the organism and therefore inadequate lubrication. This is what happens, too, when our food is insufficient and we suffer from actual hunger. Fat is the material we supply to the body. What happens to a man who has to go hungry or whose digestion is such that instead of the fats being deposited, they pass out of the body in the faeces? A person who has not enough physical material in his body becomes more and more spiritual. But this is not the right way to become spiritual, for under these conditions spirit consumes him, burns him up. Not only does he wither and become more and more emaciated, but gasses form in his organism and this condition leads, eventually, to actual delusions. There is always some disturbance in the spiritual life when a man is ill. Inadequate absorption of fat leads to wasting — or consumption as it may also be called.

Now let us speak about *protein*. The presence of protein is essential from the very outset. It is present in the egg before a human being or an animal comes into existence. We can therefore say that protein is the substance which really builds up the human body and is the basis upon which it develops; it is the primary and fundamental substance out of which everything else in the body must unfold. Protein is present in the mother's womb as a tiny egg; the fertilisation of the egg enables the protein to become the basis of the human body. But man needs protein all the time; it must be a constituent of his regular food. If his organism contains too little protein, or

he cannot thoroughly digest it, he will gradually waste away; but if at any moment of his life he were without protein he would immediately die. Protein is essential both for the beginning of existence and for man's very life. Absence of protein means death.

Now let us think again about the different kinds of foodstuffs. The salts have a special connection with the front part of the head; that is where they are chiefly deposited. The carbohydrates are deposited a little farther back. Upon the carbohydrates depends the proper shaping of the human form. The fats are deposited still farther back and from there they begin to fill out the body. The fats do not enter directly into the body but pass from the blood into the head and are distributed to the body from there. All the substances, including protein, pass through the head.

Now there is a great difference among the carbohydrates. In foodstuffs such as lentils, beans, peas, rye, wheat, it is the *fruit* that is the source of the carbohydrates. The wheat we get from the earth is the fruit of the plant; the lentil is fruit. A property peculiar to fruits is that they are already digested in the stomach and intestines and it is only their *forces* that reach the head. Typical conditions which follow the eating of lentils and beans are evidence to us all that the whole process of digestion is taking place in the intestines. The characteristic of fruits is that they are already fully digested in the intestines.

But we cannot eat the *fruit* of the potato plant, because it is poisonous. There is a difference between the potato as a foodstuff and lentils, beans, peas, rye, wheat, etc. What part of the potato plant do we eat? We eat the tuber, the bulb. Now the bulb is just that part of a plant or root which is *not* digested in the intestines. Fruits are digested in the intestines. But the fruit of the potato plant cannot be eaten, and the bulb is not a root in the real sense. Very well, then, when a potato is eaten it passes into the stomach and intestines where it cannot be digested; the blood carries it upwards in an undigested state. Instead of reaching its own area of the brain in a fine, etherealised condition and being at once sent down into the body — as happens with foodstuffs like rye or wheat — the digestion, properly speaking, has to take place in the brain. When we eat bread made of pure rye or wheat, it is fully digested in the stomach and intestines; the onus of digestion does not devolve upon the head but the head is left free for its task of providing for the distribution over the body. On the other hand, when we eat potatoes or potato-bread, the head has to cope with the actual digestion. But when the head has to be employed primarily for the digestion of the potatoes, it becomes incapable of *thinking* in the real sense, because in order to think its forces must be kept free; the abdomen should relieve it of the task of digestion. So if potatoes are eaten in excessive quantities … this is a habit which has been steadily on the increase since the potato was introduced as an important foodstuff in Europe … the head is gradually

thrown out of gear for the purpose of really active thinking and little by little man loses the capacity to think with the middle part of his brain; he thinks, then, only with the front part of the brain — which is dependent on the salts. This tends more and more to make him a purely intellectual, materialistic thinker. The front part of the brain is incapable of genuinely spiritual thinking. It is through the front part of the brain that man becomes intellectualistic.

What has happened is that really deep and inward thinking began to wane in Europe from the moment the potato became an important constituent of food. We must realise, of course, that the human being is not a product of the forces of the earth alone. I have told you many times that man is created by the forces of the whole surrounding universe, by the forces of sun, moon and stars. When a man feeds on potatoes, the middle part of his head is used solely for the purpose of digesting them. The result is that having shut himself off from the universe around, he no longer acknowledges its existence and declares: All this talk about spirituality streaming down from the universe is so much twaddle! … And so it may be said that too much potato food has helped to drive the modern age into materialism.

Needless to say, it is chiefly the poor who are obliged to fall back on potatoes simply because they are cheap; the well-to-do can afford to buy food containing substances like spices

and salts which work upon the front part of the head. Spices have the same effect as salts in the front part of the head. And so these people become thorough-going intellectualists; and the others, being incapable of really active thinking, can easily be imposed upon. The potato as a foodstuff is related in a very special way to man's spiritual activity; it has actually furthered materialism.

Thinking now of the different members of man's being, we shall say: the physical body originates in the first place from protein. Protein is connected with the birth and death of the physical human being. The etheric body is at work in the fats, the astral body in the carbohydrates; the "I," or Ego, in the salts.

It is the astral body that enables man to have feeling and perception. When I feel a blow on my hand, it is not the physical body in which the feeling arises; if it were, then everything physical would have the faculty of feeling. The flesh is pressed back, and then the muscle; the flesh in the muscle is forced away from the astral body and then I feel something — in the astral body. All feeling arises in the astral body. But the astral body must be able to carry out its functions in the right way. I have told you that if the astral body, even by day, is in a sleepy condition and not actively at work, corpulence sets in and deposits of fat accumulate. Or again — if a man is active only in his head, in his intellect, fats

are deposited. But the astral body which is also at work, for example in speech, needs the carbohydrates to be present all over the body, not only in the head. The astral body has to move the legs, the hands, and so on. It needs the presence of carbohydrates all over the body. If a man's food contains carbohydrates in the form of rye or wheat, the forces of these substances stream into the whole body; but if the food consists only of potatoes, the forces accumulate up there in the head and the man becomes weak and debilitated; his astral body cannot be as active as it ought to be. So that what is spiritual in the human being becomes exhausted, less and less active, when he cannot provide his organism with carbohydrates. This is impossible if he feeds entirely on potatoes because the head has so much to do that the body has to suffer.

And now let us consider how science sets to work. Investigations are made in order to discover what quantities of carbon, oxygen, nitrogen, hydrogen, sulphur and other substances — the four named being the main ones — are contained in protein. It is then found that carbon or hydrogen are present in protein in such and such percentages; in fat the percentages are different and in the carbohydrates different again. But science has no idea of the significance of substances *in themselves*; science only knows the percentages in which the various constituents are present. But that does not really lead anywhere. The constituents of

the potato and the constituents of rye or wheat work in quite different ways. The important thing to know is that when the flower or fruit of a plant is eaten it is digested in the intestines; when a root is eaten it is really digested in the head. Upon no other basis can these things be applied in medicine.

Anyone who can think in a truly therapeutic way will know that a medicament prepared from flowers, or seeds, or fruits, has its main effect in the intestines; a preparation of roots, on the other hand, will have a remedial effect upon the head. When we eat roots, an effect is made upon the head — a material effect. It is very important to know this.

But we can go further. If a human being has been so debilitated by feeding on potatoes that he is not only incapable of moving his hands and feet properly but is so exhausted that the organs connected with propagation are no longer active, then the matter becomes still more serious. Let us suppose that the effect of feeding on potatoes is so overpowering that the organs of procreation in the female are weakened and impaired. … Man, as you know, is not only a product of his ancestors but as a being of soul-and-spirit he comes from the spiritual world; this being of soul-and-spirit unites with what is provided by the ancestors. I will make a rough sketch — everything of course is very much enlarged. (*Dr. Steiner makes a sketch on the blackboard*.)

The human being originates from the fertilised female ovum. Star-like formations then appear, cells separate off and from these separated cells the body gradually takes shape. But no human body can form unless the being of soul-and-spirit coming from the spiritual world unites with what is developing here.

Now if circumstances are such that the mother or the father has been eating too much potato food, the seed from which the embryo develops will from the outset be of such a nature that a great deal of work devolves upon the head. If the father and mother have been properly nourished with bread made of rye or similar substances, the embryo will have more or less this appearance. (*Sketch*.) But if potatoes have been eaten in excessive quantities the following happens. The preponderating part of an embryo is the head — it is a round dome. The soul-and-spirit must penetrate into the head and, once there must begin to be active. The soul-and-spirit works chiefly on the head while the human being is still an embryo in the mother's body.

If the soul-and-spirit finds in the embryonic head elements which derive from the rye- or wheat-components of the mother's food, then it can work in the proper way. For you see, the flowers containing the grains of rye or wheat have grown upwards from the earth and the Spiritual has already streamed towards the plant, is already allied with the plant.

The being of soul-and-spirit is able to work when conditions arising from food composed of the fruits of plants are encountered in the mother's body. It is a different matter altogether if the being of soul-and-spirit finds an embryonic head that is the result of the mother having eaten excessive quantities of potatoes. … For just think of it: the potato lies right down in the earth, it is covered by the soil, has to be dug up from the ground; it grows in the darkness, it has no bond with the Spiritual; the being of soul-and-spirit descending from the spiritual world encounters a head that is a product of darkness; the spirit cannot penetrate it, and the result is hydrocephalus — water on the brain. The embryo develops a gigantic head (*sketch*.) For if the spirit is unable to make any real approach, the Physical grows apace and hydrocephalus develops. If the spirit is able to approach, the water is held in check; the spirit is able to work in the physical substances and the head develops in its proper and normal proportions. The gigantic heads often to be seen in embryos are the outcome of faulty nutrition for which potato food taken in excess is often responsible. And so this kind of food not only causes exhaustion and weakness in the adult human being but even at birth the soul-and-spirit was not, in the real sense within the physical body.

You know that man consists of physical body, ether body, astral body and "I" but these members of his being do not interact in the same way at every age of life. Until the age of

seven, ether body, astral body and the “I” are still only making their way down into the physical body of the child. When the ether body has penetrated fully into the physical body, the second teeth appear; when the astral body has penetrated fully into the physical body, puberty is reached. Therefore if potato food taken in excess has made it difficult for the soul-and-spirit to enter into the embryo in the real sense, this will also have an injurious effect upon what happens at the age of 14 or 15. All through his life such a human being will go about as if his body did not really belong to him, as if it were hanging about him like a bag. The effect of too much potato food may therefore be that human beings are born without sufficient strength to cope with life and its demands.

These are matters of tremendous importance! Social conditions depend upon many factors other than those mooted at the present time. Social conditions depend, too, upon really *wise* cultivation of the fields: for example, not using the soil for the production of *more* potatoes than people can consume if their strength is to be maintained. Social science must go hand in hand with a true knowledge of nature. That is absolutely essential. To speak only about surplus values, capital, and so forth, is of no fundamental value. If Communism ever succeeded in wiping out capital and assuming control of everything … well, it would all come to nothing if the science at its disposal did not know how to utilise the fields wisely, did not know that potatoes are not so

good for the stomach, as rye or wheat. These are the kind of things to bear in mind. Continual talking in circles leads nowhere. What we need is a real science, a science which understands how the spirit can work in matter.

Anthroposophy is obliged, quite against its will, to battle on two fronts. And why r Scientists to-day are occupied only with matter, with the percentages of carbon, oxygen, nitrogen contained in protein and so forth. But this tells us nothing essential about matter itself. Physical science does not really understand matter, because to understand matter one must know how the spirit is working within it. Suppose a man wants to know all about a watch. He says to himself: This watch is made of silver. The silver came from such and such a mine; then it was taken by train to such and such a town and delivered to merchants. The watch has a china face inscribed with figures. The china was manufactured in such and such a town, then sent somewhere else … and so on and so on. But at the end of it all he knows nothing essential about the watch! Nor will he until he knows exactly what the watchmaker did. To understand why a watch goes, it is not at all essential to know how and where the silver was mined; what *is* important is to know how the watchmaker made the watch go, how he adjusted the wheels and so forth.

To know in the abstract that foodstuffs are composed of so much carbon, oxygen, nitrogen, fat, carbohydrate, makes no

difference at all to health and disease; but what is very important for health and illness is to know, for example, that potatoes nourish the mental life of human beings as little as they nourish their physical bodies. For other purposes it is, of course, quite useful to know about the silver coming from mines and the rest of the process, but for any understanding of health or sickness among men this kind of knowledge is of no importance. Because it does not realise its own shortcomings, science puts up a fight when Anthroposophy tries to provide what is lacking. The one battlefront is therefore against materialism which declares that the explanations given by Anthroposophy are sheer fantasy and reproaches it for speaking of the spirit. That is the one front.

The other front is constituted by the attitude of theology and of the representatives of religion. A great deal is said about the soul reaching heaven through prayer and the sacraments. Well and good … but if a man is not able to make proper use of his body and therefore lives in the physical world without being rightly adjusted to the conditions of earthly life, then it will be very difficult for him to find his bearings after death. Of this, however, the theologians do not speak. Man must be able to cope with practical life; he must know how to take hold of matter. Religion and theology talk a great deal but do not succeed in making the human being so strong in earthly life that after it is over he can find a firm basis. Prayer that has no foundation in knowledge actually sidetracks men from

recognising the essentials of a really healthy life. It is hardly likely that you will ever have listened to sermons on subjects like the respective merits of potatoes or wheat as food! At any rate it will not be your experience that most clergymen think it important to preach about the effect of rye or wheat upon health. They attach no importance to these matters because in their opinion they are not sacred. To pray or to expound the Gospels, that and that alone is sacred according to their way of thinking. … But the Divine is at work in the whole of nature, not only when men pray or converse on the subject of Holy Writ. The Spiritual is an active power in nature. If man prevents the Spiritual from having access to his head because by eating potato food to excess he gives the head too much to do … well, he may pray, but it will be to no purpose because he has been sidetracked from the Spiritual. That too is something that escapes notice. God did not find the earth as a clod out of which all things were then made; the Divine Power is active everywhere, in every single particle, and it is there that we must seek for its manifestations. But when this is done, the theologians accuse us of materialism! By the scientists we are called deluded spiritualists, by the theologians, materialists. This shows how much weight can be attached to such statements! It was just the same in 1908 when Anthroposophy was said to be under Jesuitical influences; it was stated that anthroposophists were being delivered by their leaders into the hands of the Jesuits. In the meantime things have changed and now the Jesuits are

saying that anthroposophists have been delivered into the hands of the Freemasons!

But these are not the things that really matter. What does matter is that men shall acquire a kind of science able to explain, for example, why hydrocephalus develops in the embryo instead of a perfectly proportioned head.

You will be saying to yourselves that after all there are plenty of people who show no signs of hydrocephalus. That, of course, is true, because other forces counteract the tendency and then, at the time of birth, the head is not as disproportionately large as it was in the embryo; it may actually be quite small but still hydrocephalic. The fact is that since the introduction of potato food, embryonic heads are always much too large. In the later stages they contract but this very contraction has an injurious effect because they are not able to take in what is needful — they can only take in water. When the human being has been born, hydrocephalus is not *only* indicated by the size of the head. Typical hydrocephalus, it is true, is to be recognised from the size of the head, but the point of real importance is whether water is serving its proper purpose or whether other elements are playing a part. This is just as important as anything else that may be brought to the knowledge of mankind by science on the one hand or theology and religion on the other. But it is something that must be approached from the right point of

view.

What sort of treatment is meted out to Anthroposophy to-day? A little while ago, people who called themselves “non-anthroposophical students of Anthroposophy” held a kind of congress in Berlin. They state that they are not Anthroposophists but desire to know about Anthroposophy. Well … a certain Dr. G. who was here at one time but subsequently left us, had a great deal to say. He addressed an audience of clergyman, licentiates, professors. And now, on the basis of what he said, people are lecturing against Anthroposophy here, there and everywhere. You will suppose that what Dr. G. told these people convinced them that Anthroposophy is very harmful. But I ask you — just think of the average mind of a typical clergyman or professor to-day, and then listen to what Dr. G. said to them. He said: Anthroposophy is particularly harmful because the anthroposophists are being duped … what Dr. Steiner and Frau Dr. Steiner would really like would be to cut off a portion of the earth, make a planet of their own and together with all the anthroposophists establish a planetary colony in the universe! That is what Dr. G. said to these enlightened people. As you can imagine, none of them really believe it, yet they act as if this kind of talk had convinced them of the harmfulness of Anthroposophy.

What lunacy it is! But these same enlightened people

participate in many different kinds of meetings as well, where destinies are determined. At these meetings they are no shrewder than they were at the other … and so one cannot help wondering what kind of people are ruling the world to-day! The hostility to Anthroposophy is really hostility to truth. People are determined not to allow these things to come into the open. So they say that Anthroposophy is very secret. But how, I ask you, how can it be anything else? There is, in reality, no greater secrecy about it than there is when a man has stolen something and bidden it; until it is found it is secret. Anthroposophy is secret in the same sense — because it has been cast into obscurity by science and the other branches of cultural life. That is why Anthroposophy seems to suggest a kind of secrecy. But it ceases to be secret the moment it is found! Anthroposophy has no desire at all to be mysterious but to bring into the light of day things that have been obscured and hidden by other influences. … Now I have to travel to Vienna and I will let you know when we can continue these lectures.

4. Effects of Substances in the Cosmos and in the Human Body

Iron, Sodium, Carbon, Chlorine

(Dr. Steiner asks if anybody has a question.)

Questioner: I believe that we are expecting Dr. Steiner to make some further remarks about the stars.

DR. STEINER: Well, I will just try to connect my remarks with what I said last time and then build further on it. I will go over it again very briefly. We heard that everything which takes place with regularity in the universe, for instance, day and night, the course of the sun or the sequence of the seasons, is all connected with what is necessary in human life. The regular intake of food is necessary within the rhythm of sleeping and waking; the regular rhythm of breathing, circulation of the blood, and so on, is necessary. When we consider all this, we see that it is connected with what can be calculated through Astronomy. On the other hand, all that which happens less regularly — which certainly can be calculated but still happens less regularly, for example, comets and meteors — all these phenomena are connected with what is *free will* in man, with what gives rise to free will in man.

First and foremost we must turn our attention to a

substance which is particularly important, which is abundant on the earth and indeed in the universe, and is present in the meteors which fall on the earth. This substance is *iron.* Iron exists in such abundance on the earth that the whole of our modern culture and civilisation may be said to be based on it. Just think of all the purposes for which iron is used! It is only quite recently that people have begun to manufacture all sorts of things from substances other than iron. During the last two centuries all the great advances, as well as our social conditions, have been due to iron. We must assume that iron is everywhere present in the universe because when anything falls to the earth from the heavens, it is found to be of iron.

Now let us consider the iron in our own bodies. It is very remarkable that at the beginning of his earthly life the human being drinks a substance which contains practically no iron — namely, milk. The mother's milk contains hardly any iron. So we can say: it is only in the course of his life that man begins to take in iron with his food. What does this mean!

Think of a baby: it kicks a lot and certainly dreams; but it has neither independent thought nor any free will in the real sense. In the measure that it attains freedom of will, its instincts call for iron. Iron is really necessary for free will. And if you come across a man who is hoarse or has a very weak voice and you want to know what is really the cause of it, you must above all find out if he is getting enough iron, for a man

who gets too little iron shows this in the lack of will as expressed in speech. When you come across a man who can literally bellow when he is talking, you need not worry whether he is getting enough iron. But in the case of a man who can hardly make himself heard, you are perfectly right to consider how far iron is lacking. Man's need of iron for his free will is shown outwardly. We can therefore easily understand that the iron which is everywhere present in the universe and in the earth is connected with man's free will.

Now everything that happens influences everything else and we must be clear that iron alone does not form us or the universe — otherwise we should be iron men … which would certainly make for strength, but if we were iron men we could not do many other things. So we must look for something which can form compounds with iron.

I told you recently that *soda* is especially important for everything in us that has to do with *thinking*. For soda is sodium carbonate and sodium carbonate has a stimulating effect upon the head. Everything that is connected with our thinking, with our head, with our inner light, has to do with soda. You will remember that I recently explained this.

In order that a substance like soda may be present in us, we must take in the oxygen contained in the air. This we do in breathing, for the air consists of oxygen and nitrogen — of

many other things too but they play a less important part. We take in the oxygen with our breathing. What about the carbon? We form carbon in ourselves out of the food we take. Carbonic acid is formed and we then get carbonate of soda. Soda is very important for our heads. We have sodium carbonate — soda — within us, and it is all the time passing into our heads. In propagation, too, it has its part to play as I once told you. So you see soda is of great importance to *us*.

And now I will tell you something else. I spoke to you once — it was some time ago — about colours. The chief colours are to be seen in the rainbow: violet, blue, green, yellow, then orange and then red, in order. These are the colours of the rainbow. Nature creates these colours in the rainbow, but man can also create them by admitting just a tiny shaft of light through the window of a dark room. (*Sketch*.) Here is a window, here a small hole where the shaft of light enters. Here you place a glass prism so that the light passes through it and in this way you can get the colours as in the rainbow. You can then project them on a wall.

Now this succession of colours, this spectrum which appears here in the prism, as in the rainbow, has this peculiarity: it is only properly shown when one uses a glass prism, or sunlight. When one uses other bodies, one does not get this sequence of colours but only single colours. For example, under certain circumstances it can be dark

everywhere, except for a fine yellow line in the middle. How is this? If you put sodium into a flame and let it burn in the flame, then you get this yellow line, not the red line, but the yellow. Thus when you take a flame, let the light pass through a small hole and take a prism, you do not get a spectrum of the sun, but a yellow line. When you take a tiny bit of sodium and bring it into this large space (*sketch*) you get the fine yellow line. There need not be much sodium — everywhere there are these fine yellow lines — even the very tiniest amounts of sodium give these yellow lines. … Sodium is widely, very widely spread in the universe. If you ask yourselves, why is sodium so widespread, then you must answer: in order that this sodium carbonate, this soda, can come into existence. It is spread everywhere in order that human heads can exist. Iron is everywhere present in the universe in order that we can have free will. Sodium is everywhere in order that we can have heads. Were sodium not present in the universe, it would be quite impossible for us to have heads.

Now what must be present in order that we, as human beings, can have heads? There must be carbonic acid, that is to say, carbon and oxygen; and there must be sodium. Sodium, as I have told you, is present everywhere in the universe. Carbon we have in ourselves. It is all the time being created in us from our food; only it is transformed because we do not want to be dead carbon men, but living men, who destroy substance and then re-create it. And especially we

create carbon. Thus we have the carbon ourselves, we take the oxygen from the air and the sodium from the universe. These must be present, in order that we may have heads.

You see now that in this way, if these things were present which I have described, we could have heads and we could have our free will. But how would this free will help us as earth-men if we had not arms and legs so that we could use it? We must also be able to nourish ourselves. In order that we can be built up from the materials of the earth, we must be able to take in food. This depends on the fact that we have in our lower organs something similar to what we have in our breathing. We breathe in oxygen; we breathe out carbonic acid gas. If we did not breathe out this carbonic acid, then the plants would not have carbon, for it is taken from the carbonic acid of men and animals. Thus plants are formed by what is breathed out by men and animals. Moreover, the oxygen takes our carbon away — it combines with our carbon. But first we must produce the carbon, we must first have it. To this end we must take food. Oxygen is frightfully greedy for carbon. If we did not give up our carbon to the oxygen, we should at once get fits of suffocation when the carbon cannot get out — that is to say, when the carbonic acid cannot get out. We should suffocate at once. Oxygen is really greedy. Our stomach must also take in food. Just as the oxygen takes up carbon and carbonic acid is formed, so must our stomach greedily take in carbon. Our stomach literally craves for food.

Now we might imagine that if oxygen were in our stomach, it could get out through the mouth and nose. The oxygen is there inside: it absorbs the carbon. There must thus be something in the stomach which also serves the process of the taking of nourishment. And so there is: a substance very like oxygen is in the stomach and is continuously being secreted, namely, *chlorine*.

I have told you already that soda is used for bleaching and especially for washing. But chlorine is also used for bleaching, is in fact, contained in washing blue. It also is a material which has light in itself, which carries light. Chlorine is very similar to oxygen.

In the breathing organs it is the oxygen of the air which continuously extracts the carbon from our bodies. In the stomach there is chlorine which, because it is greedy, frightfully greedy, similarly attracts to itself all hydrogen. And together with the hydrogen it forms hydrochloric acid.

This hydrochloric acid flows about in our stomach and it is greedy for food. When we take food into our mouths it must first be dissolved by the acid in the saliva — ptyalin. This ptyalin is similar to hydrochloric acid. Then, when the food gets to the stomach, there is pepsin, which is somewhat similar to hydrochloric acid. But pepsin is hydrochloric acid which is *alive*. It absorbs food greedily. If a man has too little

hydrochloric acid he has a bitter taste in his mouth. Why? Because hydrochloric acid takes up all foodstuffs greedily and dispatches them to all parts of the body. So when the hydrochloric acid does not work properly, the food which a man has eaten remains in the stomach. Then he has a bitter taste in the mouth when it comes up as gas, and a coated tongue. Some hydrochloric acid must always be active inside us, especially if we are to build up our limbs.

And so we can say: Iron would not really help us unless we could use it in the operations of free will. We must build up our limbs. In order to do this, chlorine and hydrogen must combine to form hydrochloric acid. We must have this in us.

Now consider: Apart from all else, you have everywhere in your bodies hydrochloric acid, and carbon, and much else. You must look at man like this. If this is a man (*sketch*), there is hydrochloric acid everywhere. This must take up tiny particles of iron from the blood. Then a man can develop a free and powerful will. So much depends upon how a man combines the iron in himself with what comes from the hydrochloric acid, from the chlorine. This process must always take place in the right way. Now it can happen that young girls at puberty have to expend so much energy that they have not enough left to combine the hydrochloric acid with the iron. Then, on the one hand, there is iron which makes them heavy and cannot combine with what comes from the chlorine

because there is not enough energy to make this possible. It is useless simply to give iron to such a girl; for very likely she has enough iron already. She has anaemia, which young girls get, not because they have too little iron, but because the iron cannot combine with the chlorine. So you see this power to combine the iron with the chlorine must be developed in us.

Now think of iron and then look out into the cosmos. Iron is connected with Mars. Mars is really the creator of iron in our planetary system. Man is related to Mars and the forces of Mars in many ways. I have already spoken about these things and shall do so again. Iron is connected with Mars. When we ask: What is it that has a great influence on a man when he does not properly produce his hydrochloric acid, when his stomach does not function properly, we find that it is Mercury, the planet Mercury, which is connected with chlorine. So that in the case of a young girl who is anaemic, we can say: the Mercury forces (which should work on the stomach and its appendages) and the Mars forces are not working well together. Mars creates in us those forces which make it possible for us to have iron. Mars must be there in order that we may have the power to use iron. And iron must be there in order that we may have the power to exercise free will. Mars gives us the *power* of the iron; meteors, since they are all the time giving up iron to the air, supply the substance of iron. Mars is that body in the cosmos which enables us to use in the proper way that iron which the meteors and comets bring

to us in an irregular manner. It is actually the force of Mars together with that of the comets and meteors which enables us to *speak*. … People just take human speech casually, and see nothing special in it. They do not really *think*, indeed they cannot really think, because they turn their attention to something which is not reality. Quite trivial matters are evidence of this. Just recently we have had a fire alarm test here. Naturally in such tests everything is done as it would be in the case of an actual fire. The Catholic Sunday paper announced that there had been a real fire here which was soon extinguished. You see, people are willing to think about something that didn't happen but not about something that did! That is just what is peculiar to-day: people think about all kinds of things that have never happened and have no inclination to think about what did. But a man who is always thinking about things which haven't happened loses all sense of reality. And that is so general nowadays. It is crippled thinking … after all, when people continuously lie what is it but crippled thinking!

Thus free will in man is produced by the Mars force and comet force. This, however, must work properly with the Mercury force within him. It is Mercury which causes in our stomach the right hydrochloric acid combination. Just as we make use of soda in our heads, so in our stomachs we use what comes from hydrochloric acid. Soda gives light to the head, and also to the embryo which is, for the most part,

head. When the human being reaches puberty, the hydrochloric acid is taken over by those parts which are connected with the stomach. And if the hydrochloric acid combines with the soda which is everywhere present, we get ordinary salt. In our heads we need soda, with which we also bleach. In our stomachs we need ordinary salt. This is not only taken in with the food but is always being created, so that down there in the body too there may be light. For both soda and salt are carriers of light, are transparent to it.

Now it is not without purpose that we add salt to our food. We salt our food in order to adjust ourselves properly to nature because we always secrete rather too little of our own salt. Thus the Mars force and the Mercury force must work together properly; if this happens, the iron that is necessary in our limbs will be at the disposal of our will, and we shall be able to use them with healthy, free will.

You can see in the case of an anaemic girl, for example, that what comes from the stomach and depends on hydrochloric acid does not properly combine with the iron. Now we must investigate, and perhaps it will be found that the fault lies with iron — perhaps there is too little iron (which may well be the case in anaemia); or perhaps there is too little chlorine (which may also be the case). Then we must try to remedy this. But the trouble in most cases is that the two do not combine: Mars and Mercury in the human being do not

combine. That is usually the cause of anaemia.

In modern medicine people always want to find a single cause of disease … but diseases may look identical outwardly and inwardly be quite different! If a girl has anaemia we must not only ask: has she too little iron? too little chlorine? … but we must also ask: or do they not combine properly? If the girl has too little iron, we must see to it that she is given iron in the appropriate form. Well and good, but that is not so easy as it seems. For if, as usually happens, iron is introduced into the stomach, the chlorine must have the inclination to combine with this iron, otherwise the iron is left in the stomach, passes away through the bowels and does not get into the organism. Thus a way must first be found of bringing the Mercury force, the chlorine force, into the human being. And so it is of great importance not simply to give the iron as iron, but to introduce the iron into the stomach in such a form that it may somehow be taken up by the chlorine. But for that purpose a special medicine must be prepared, for example from spinach. Spinach contains iron. One can also make a medicine from other things, for example from aniseed and so on; but especially from spinach — not as ordinary spinach though it may also help if eaten just as it is. … A medicine must be prepared from the iron in spinach, for it is then in a form in which it can be properly taken up by the blood. So, in a case where one finds that there is too little iron, one must try in this way to introduce more. But the disease may also be due to

the fact that there is too little fat in the stomach to create hydrochloric acid. A certain scientist has discovered that in anaemia too little chlorine is created and so the disease has also been given the name of Chlorosis. But the real connection is not understood. One must not just try to introduce hydrochloric acid into the stomach for perhaps there is already enough of this, especially if it is brought in from outside. But what is important is that the chlorine should be produced in the stomach itself, that the stomach should have the capacity to produce chlorine. Man needs his *own* chlorine, not that which is introduced from outside. And for this it is necessary to introduce into the stomach something prepared in a special way from copper. This will make the stomach more capable of creating chlorine. … So you see, things must be looked at from all sides. Usually in anaemia it is not the iron which is lacking, or the chlorine, but the trouble is due to the fact that the two cannot combine. Mars and Mercury in man cannot come together.

In the cosmos, between Mercury and Mars, stands the Sun (*diagram*). Just as Mars is connected with iron, so is Mercury connected with quicksilver or with copper. If when there is a lack of chlorine one needs the Mars forces, and when there is a lack of copper the Mercury forces, so when the two cannot come together one needs to strengthen the working of the Sun forces which lie between them. For it is the Sun force in man which brings chlorine and iron together. And this Sun

force can be stimulated by giving gold in tiny quantities. When one tries to cure with gold — naturally in specially prepared forms because otherwise it lies in the stomach and is not absorbed — one can bring Mars and Mercury together again.

So you see, in illnesses of this character three kinds of medicine come into consideration. One cannot cure the disease merely from its name, but one must give a preparation of copper or of iron taken from a plant, from spinach for example. Or gold — in the appropriate form — may be necessary to bring them together. It amounts to this — when one only knows what happens here on the earth, one can know nothing essential about man … and things that outwardly appear to be identical are called by identical names. But that is just as if we wanted to use a razor for cutting meat, simply because it is a knife. … Anaemia's are not always the same. One form is due to poverty of iron, another to poverty of chlorine; and a third form is due to the fact that they do not harmonize properly … there are different kinds of anaemia, just as there are different kinds of knives — razors, table-knives, pen-knives. But people always tend to mix everything up. A man may say of the condiments on the table that they are all additions to food, and so he salts his coffee, since salt is a condiment and so is sugar! This is on a par with the people who proclaim to the world: anaemia is anaemia. It is just as nonsensical as saying: condiment is condiment. For when one tries to cure an anaemia that is due

to disharmony by means of iron, one does the same as when one salts coffee.

You see, it is a matter of looking for something which is not just at the end of one's nose. It can be said with truth that our science has progressed a nose's length, for when one looks in a microscope, one always knocks one's nose! In life it is not so simple. It is said of a man who does not see something that he sees no farther than his nose. (Those people to-day who are always looking through microscopes, they also see no farther than their noses). … But one must look up to Mars if one wants to see what is important in ordinary iron. Why? The connections can only be discovered by looking out into the cosmos. It is not poetical fiction to say that Mars has this or that power. It is not that one develops a sort of dim, vague clairvoyance which looks up to Mars, but one must get to know many things: one must learn to understand the Mars force in man and then one can really speak of Mars; otherwise not. And so it is with the other planets. We can for example say: it will always be found that when something is *inwardly* lacking in a human being — as in the case of anaemia when the iron cannot be assimilated — this is connected with an irregular working of Mercury in the organism. If something is *outwardly* lacking, this is connected with an irregular working of Mars.

There are, for example, girls who suffer from anaemia at

puberty — this means that something is inwardly not as it should be. The Mercury force is too weak and we must strengthen it by means of the gold forces.

There are also boys — you know, with boys at puberty something happens outwardly, namely the change of voice; sometimes a hoarseness appears; while with girls something happens inwardly — the periods commence. This hoarseness corresponds to the anaemia of girls — boys of course may suffer from it too and in that case there is also something wrong inwardly. But when the change in the voice does not take place properly and a certain hoarseness appears, as is often the case, then the real culprit is not the Mercury force, but the Mars force. Although iron comes not only from Mars but from the meteors, one must in any case strengthen the Mars forces — and this may be possible with gold. You see, the onset of puberty expresses itself in quite different ways: with girls, in that they come more under the Mercury forces; with boys, in that they come more under the Mars forces and are inclined to get hoarse; or if they are not always hoarse they become so every winter.

These things must be investigated by *Spiritual Science* to-day. The other sciences have no idea at all of these things. When anaemia is caused by a poverty of iron, for example, it is a matter of introducing into the stomach in the appropriate way that which, in the plant, brings about the right divisibility

of iron. We only really get to know the nature of man when we relate it to the whole of the cosmos. This is infinite, but we must realise that all the stars of heaven have their particular influence on man. This is of the utmost importance.

We will deal with other matters next time. Perhaps something will occur to you in connection with these things. You might also ask yourselves: How is the people's food related to their health? Something may have occurred to you in connection with prevalent epidemics, and so forth. We might speak about this. Think it over and perhaps by next time you will have found something you would like to hear about in connection with nutrition.

5. The Growth of Plants

Causes Of Infantile Paralysis

(Dr. Steiner asks if anyone has a question.)

Questioner: Dr. Steiner has spoken about epidemics and how they are to be fought. At the present time an epidemic has broken out — Infantile Paralysis — which attacks adults as well as children. Could Dr. Steiner say something about this?

Second Question: Is it harmful for people to keep plants in their bedrooms?

DR. STEINER: As for the question about plants in bedrooms, it is like this. In a general way it is quite correct that the plants give off oxygen which men then breathe in and that man himself breathes out carbonic acid gas. Thus man breathes out what the plant needs, and the plant what man needs. Now, if plants are kept in a room, the following must be remembered:

When one has plants in a room by day, things happen roughly as I have said; during the night the plant does indeed need rather more oxygen. During the night things are rather different. The plant does not need as much oxygen as man, but it needs oxygen. Thus in the darkness it makes demands

on that which otherwise it gives to man. Naturally, man is not deprived altogether of oxygen, but he gets too little and that is harmful. Things balance themselves out in nature: every being has something that others need. So it is with plants, if one observes carefully. If the plants are put outside the bedroom when one sleeps, then there is no unhealthy effect. So much for this question.

* * *

Now as to Infantile Paralysis which just recently has become so prevalent in Switzerland too. It is still rather difficult to speak about this illness, since it has only assumed its present form quite recently, and one must wait till it has taken on more definite symptoms. Still, from the picture one can form at present — we have had a serious case of Infantile Paralysis in the Stuttgart Clinic and one can only judge by the cases which have occurred so far — one can say now that Infantile Paralysis, like its origin, Influenza, which leads to so many other diseases, is an extraordinarily complicated thing and can only be fought if one deals with the *whole* body. Just recently there has been discussion in medical circles as to how Infantile Paralysis should be treated. There is great interest in this now, because every week there are fresh cases of the disease. It is called Infantile Paralysis because it is mostly children who are attacked. Yet just recently there was a case of a young doctor who certainly is no longer a

child, who was, I believe, perfectly healthy on Saturday, on Sunday was taken with Infantile Paralysis and was dead on Monday. This Infantile Paralysis strikes sometimes in an extraordinarily sudden way and we may well be anxious lest it grow into a very serious epidemic.

Now Infantile Paralysis is certainly connected, like Influenza itself, with the serious conditions of our time. Since we in our Biological Institute in Stuttgart succeeded in proving the effects of the minutest quantities of substance, one must speak about these things, even in public, in a quite different way than formerly. We have in Stuttgart simply shown that when one has any substance, dissolves it, dilutes it greatly, one has a tiny amount in a glass of water. One obtains, say, a 1 per cent solution. A drop of this is taken, diluted to a hundredth of its strength. It is now one ten-thousandth of its original strength. Again diluting this to one-hundredth of its strength, we have a solution one-millionth of the original strength. In Stuttgart we have succeeded in obtaining dilutions of one in a million, one in a billion — that is, with twelve zeros. You can imagine that there is now no more than a trace of the original substance left, and that it is a question, not of how much of the original substance is left, but of how the solution works: for it works quite differently from the original. These dilutions were made in Stuttgart and they are not so easily imitated. (Perhaps the German Exchange can do it, but nobody else!) This has been done with all sorts of

substances. We then took a kind of flower pot, and poured into it in succession the various dilutions. First, ordinary water, then the 1 per cent dilution, then the .1 per cent, the .01 per cent and so on, up to one part in a trillion. Then we put a wheat seed in. This grows, and it grows better in the diluted liquid than in the non-diluted! And the higher the dilution the quicker the growth: one, two, three four, five dilutions — up to twelve. At the twelfth, the growth becomes slower again, then increases again, then decreases again. In this way one finds the effects of minute quantities of substances. It is very remarkable. The effect is rhythmic! If one dilutes, one comes to a certain dilution where the growth is greatest, then it gets less, then again greater — rhythmically. One sees, when the plant grows out of the ground, something works on it together with its substances, something which works rhythmically in its surroundings. The soil environment works into it. That is clearly to be seen.

Now when we are clear that very minute quantities of substance have an effect, we shall have no hesitation in recognising that in such times as the present, when so many men take incorrect nourishment and then rot as corpses in the ground, this works differently. Of course, for the earth as a whole, the effect is very diluted, but still it is different from what happens when men live healthily. And here again, the food which grows out of the earth is a factor.

Naturally, people with grossly materialistic scientific views do not understand this, because they say: What importance can the human corpse have for the whole earth? This effect is very diluted, naturally, but it works.

It will be well if we speak about the whole plant. The health of men is completely dependent on the growth of plants and therefore we must know what really is involved.

I have been greatly occupied with this point in connection with Infantile Paralysis, and it has turned out that one must really concern oneself with the *whole* man. Indications have appeared for all sorts of remedies for Infantile Paralysis. The subject is of great importance, since Infantile Paralysis may play a very grievous role in the future. It is naturally a question which occupies one greatly, and I have in fact given it a great deal of attention. There will probably have to be found a treatment made up of soda baths, iron arsenite ($Fe\ As_2\ O_3$) and of yet another substance which will be obtained from the cerebellum, from the back part of the brain of animals. It will have to be a very complicated remedy. You see, the disease of Infantile Paralysis arises from very complicated and obscure causes and so requires a complicated remedy. These things have become of urgent importance to-day, and it is well that you should understand the whole question of the growth of plants.

The plant grows out of the ground — I will represent it to-day with reference to the question which has been put. (*Dr. Steiner makes a sketch on the blackboard*.) The root grows out of the seed. Let us first take a tree; we can then pass to the ordinary plants. We take a tree: the stem grows up. This growth is very remarkable. This stem which grows there, is really only formed because it lets sap mount from the earth, and this sap in mounting carries up with it all kinds of salts and particles of earth; and so the stem becomes hard. When you look at the wood from the stem of a tree, you have a mounting sap, and this sap carries with it fine particles of earth, and all sorts of salts too, for instance, carbonate of soda, iron, etc., into the plants and this makes hard wood. The essential thing is that the sap mounts.

What happens, in reality? The earthy, the solid, becomes fluid! And we have an earthy-fluid substance mounting there. Then the fluid evaporates and the solid remains behind: that is the wood.

You see, this sap which mounts up in the tree — let us call it wood-sap — is not created there but is already contained everywhere in the earth, so that the earth in this respect is really a great living Being. This sap which mounts in the tree, is really present in the whole earth: only in the earth it is something special. It *becomes* in the tree what we see there. In the earth it is in fact the sap which actually gives it life. For

the earth is really a living Being; and that which mounts in the tree is in the whole earth and through it the earth *lives*. In the tree it loses its life-giving quality; it becomes merely a chemical; it has only chemical qualities.

So when you look at a tree, you must say to yourself: the earthy-fluidic in the tree — that has become chemical; underneath in the earth it was still alive. So the wood-sap has partly died, as it mounted up in the tree. Were this all, never would a plant come into existence, but only stumps, dying at the top, in which chemical processes are at work. But the stem, formed from this sap, rises into the air, and the air always contains moisture. It comes into the moist air, it comes with the sap which has created it, from the earthy-fluidic into the fluidic-airy and life springs up in it anew so that around it green leaves appear and finally *flowers*. … Again there is *life*. You see, in the foliage, in the leaf, in the bud, in the blossom, there is once more the sap of life; the wood-sap is dead life-sap. In the stem, life is always dying; in the leaf it is always being resurrected. So that we must say: We have wood-sap, which mounts; then we have life-sap. And what does this do! It travels all round and brings forth the leaves everywhere: so that you can see the spirals in which the leaves are arranged. The living sap really circles round. It arises from the fluid-airy element into which the plant comes when it has grown out of the earthy-fluidic element.

The stem, the woody stem, is dead and only that which sprouts forth around the plant is alive. This you can easily prove in the following very simple way. Go to a tree: you have the stem, then the bark, and in the bark the leaves grow. Now cut the bark away at that point; the leaves come away too. At this point leave the leaves with the bark. The result is that there the tree remains fresh and living, and here it begins to die. The wood alone with its sap cannot keep the tree alive; what comes with the leaves must come from outside and that again contains *life*. We see in this way that the earth can certainly put forth the tree, but she would have to let it die if it did not get life from the damp air: for in the tree the sap is only a chemical, no giver of life. The living sap that circulates, *that* gives it life. And one can really say: When the sap rises in the spring, the tree is created anew; when the living sap again circulates in the spring, every year the tree's life is renewed. The earth produces the sap from the earthy-fluidic; the fluidic-airy produces the living sap.

But that is not all. While this is happening, between the bark, still full of living sap, and the woody stem, there is formed a new layer. Now I cannot say that a sap is formed. I have already spoken of wood-sap, living sap, but I cannot again say that a sap is formed: for what is formed is quite solid: it is called *cambium*. It is formed between the bark which still belongs to the leaves, and the wood. When I cut here (*see sketch*) no cambium is formed. But the plant needs

cambium too, in a certain way. You see, the wood sap is formed in the earthy-fluidic, the life sap in the fluidic-airy, and the cambium in the warm air, in the warm damp, or the airy-warmth. The plant develops warmth while it takes up life from outside. This warmth goes inward and develops the cambium inside. Or if the cambium does not yet develop — the plant needs cambium and you will shortly hear why — before the cambium forms, there is first of all developed a thicker substance: the plant gum. Plants form this plant gum in their inner warmth, and this, under certain conditions, is a powerful means of healing. Thus the sap carries the plant upwards, the leaves give the plant life, then the leaves by their warmth produce the gum which reacts on the warmth. And in old plants, this gum, running down to the ground, has become transparent. When the earth was less dense and damper, the gum became transparent and turned to Amber. You see, then, when you take up a piece of Amber, what from prehistoric plants ran down to the ground as resin and pitch. This the plant gives back to the earth: Pitch, Resin, Amber. And if the plant retains it, it becomes cambium. Through the sap the plant is connected with the earth; the life-sap brings the plant into connection with what circulates round the earth — with the airy-moist circumference of the earth. But the cambium brings the plant into connection with the stars, with what is above, and in such a way that within this cambium the form of the next plant develops. [See: *Man as Symphony of the Creative Word*, Twelve lectures given by Rudolf Steiner in

Dornach, 19th October to 11th November, 1923, Rudolf Steiner Publishing Company.] This passes over to the seeds and in this way the next plant is born, so that the stars indirectly through the cambium create the next plant! So that the plant is not merely created from the seed — that is to say, naturally it is created from the seed, but the seed must first be worked on by the cambium, that is: by the whole heavens.

It is really wonderful — a seed, a humble, modest little seed could only come into existence because the cambium — now not in liquid but in solid form — imitates the whole plant; and this form which arises there in the cambium — a new plant form — this carries the power to the seed to develop through the forces of the earth into a new plant.

Through mere speculation, when one simply puts the seed under a microscope, nothing is gained. We must be clear what parts the sap, the life sap, the cambium, play in the whole matter. The wood sap is a relatively thin sap: it is peculiarly fitted to allow chemical changes to take place in it. The life sap is certainly much thicker, it separates off its gum. If you make the gum rather thick, you can make wonderful figures with it. Thus the life sap, more pliable than the wood sap, clings more to the plant-form. And then it gives this up entirely to the cambium. That is still thicker, indeed quite sticky, but still fluid enough to take the forms which are given it by the stars.

So it is with trees, and so, too, with the ordinary plants. When the rootlet is in the earth, the sprout shoots upward. But it does not separate off the solid matter, does not make wood; it remains like a cabbage stalk. The leaves come out directly on the circumference, in spirals, the cambium is formed directly in the interior, and the cambium takes everything back to the earth with it. So that in the annual plants the whole process occurs much more quickly. In the tree, only the hard parts are separated out, and not everything is destroyed.

The same process occurs in ordinary plants too, but is not carried so far as in trees. In the tree it is a fairly complicated matter. When you look at the tree from above, you have first the pith inside: this gives the direction. Then layers of wood form round the pith. Towards the autumn the gum appears from the other side, and fastens the layers together. So we have the gummy wood of one year. In the next year this is repeated. Wood forms somewhere else, is again gummed together in the autumn, and so the yearly rings are formed. So you see everything clearly if only you understand that there are three things: wood sap, life sap, and cambium. The wood sap is the most fluid, it is really a chemical; the life sap is the giver of life; it is really, if I may so express myself, a living thing. And as for the cambium, there the whole plant is sketched out from the stars. It is really so. The wood sap rises and dies, then life again arises; and now comes the influence of the stars, so that from the thick, sticky cambium the new

plant is sketched out. In the cambium one has a sketch, a sculptural activity. The stars model in it from the whole universe the complete plant form. So you see, we come from Life into the Spirit. What is modelled there is modelled from out of the World-Spirit. The earth first gives up her life to the plant, the plant dies, the air environment along with its light once more gives it life, and the World Spirit implants the new plant form. This is preserved in the seed and grows again in the same way. So that one sees in the growing plant how the plant world rises out of the earth, through death, to the living Spirit.

Now other investigations have been made in Stuttgart. These things are extraordinarily instructive. For instance, one can do the following, instead of merely investigating growth — which is very important, especially when one is dealing with the higher potencies, say of one in a trillion — one can do the following. We take metals or metallic compounds highly diluted in the manner previously described, for example, a copper compound solution, and put it into a flowerpot with some earth in it: we put it in as a kind of manure. In another similar flowerpot we put only earth, the same earth without the manure. Now we take two plants, as similar as possible, put one in the pot with the copper manured earth, and the other in the pot without the copper manure. And the remarkable thing is: if the copper is highly diluted, the leaves develop wrinkles on the edges — the others get no wrinkles, if they are smooth

and had previously none. One must take the same earth, because many specimens previously contain copper. One dilutes it with copper; the same kind of plants must be taken so that comparisons can be made.

Now we take a third plant, put it into a third pot with earth, but instead of copper, we add lead. The leaves do not wrinkle but they become hard at the top and wither when lead is added. You have now a remarkable sight. These experiments were made in Stuttgart, and you plainly see, when you look at the pots in turn, how the substances of the earth work on plants.

You will no longer be surprised when you see plants with wrinkled leaves somewhere. If you dig in the earth there, you will find traces of copper. Or if you have leaves which are dry and withered at the edge, and dig in the earth, you will find traces of lead. Look at a common plant, say mare’s tail, with which people clean pots; it grows just where the ground contains silicon; hence the little thorns. In this way you can understand the form of plants from the nature of the ground.

Now you can see of what importance it is when quite tiny amounts of any substance are mixed in the earth. Naturally, there is a churchyard somewhere outside, but the earth is everywhere permeated with wood sap, and the tiny quantities penetrate everywhere into the ground. And having

investigated how these tiny quantities work, of which I have told you, we say: That which disappeared into the earth, we eat it again in our food. It is so strong that it lives in the plant form. And what happens then? Imagine I had thus a plant form from a lead-containing soil. To-day it is said that lead does not arise in soil. But lead *does* arise in soil, if one puts decaying living matter in it. It simply does arise in soil. A plant grows out of it: one may say, a lead-plant. Well, this lead plant when we eat it, has a quite different effect from a lead-less plant. Actually, when we eat a lead plant, our cerebellum, which lies at the back of the head, becomes drier than usual. It becomes drier.

Now you have the connection between the earth and the cerebellum. There are plants which simply through the constitution of the earth, through what men put into the earth and what then spreads everywhere, can dry up the cerebellum. As soon as our cerebellum is not in full working order, we become clumsy. When something happens to the cerebellum we become awkward and cannot properly control our feet and arms; and when the effect is much stronger, we become paralysed.

Thus, you see, is the connection between the soil and paralysis. A man eats a plant. If it has something dying at the edge of the leaves, as I have described to you, his cerebellum will be dried up somewhat. In ordinary life this is not noticed,

but the man cannot any longer rightly direct his movements. If the effect is much stronger, paralysis sets in. When this drying up of the cerebellum happens in the head, so that man cannot control his muscles, at first this affects all those muscles which are dependent on a little gland in the head, the so-called pineal gland. If that happens, a man gets influenza. If the evil goes further, influenza changes to a complete paralysis. So that in every paralysis there is something that is inwardly connected with the soil. And so you see knowledge must be brought together from many sides if one is to do anything useful for men. It is useless to make a lot of statements — one must do so and so! For if one does not know how a man has taken into his organism something dying, one may have ever such good apparatus and the man will not recover. For everything that works in the plant and passes over from the plant to the man, is of great importance.

Wood sap develops in man as the ordinary colourless mucus. Wood sap in plants is, in man, mucus. The life sap of the plant which circulates from the leaves, corresponds to the human blood. And the cambium of the plant corresponds to the milk and the chyle in the human being. When a woman begins to nurse, certain glands in the breast cause a greater flow of milk. Here you have again something in human beings which is most strongly influenced by the stars, namely, *milk*. Milk is absolutely necessary for the development of the brain — the brain, one might almost say, is solidified milk. Decaying

leaves create no proper cambium because they no longer have the power to work back into the proper warmth. They let the warmth escape outwards from the dying edges instead of sending it inwards. We eat these plants with an improperly developed cambium: they do not develop a proper milk; the women do not produce proper milk; the children get milk on which the stars cannot work strongly, and therefore they cannot develop properly.

Hence this Infantile Paralysis appears specially among children — but adults can also suffer from it, because men are all their lives influenced by the stars.

In these things Science and Medicine must work together: they must everywhere work together. But one should not isolate oneself in a single science. To-day there are men who specialise in animals — the zoologists; in men — the anthropologists; or in parts of men, with sick senses, or sick livers, or sick hearts — specialists of the inner organs. Then again there are the botanists, who study only plants; and the mineralogists, who study only stones; and the geologists who study the whole earth. Certainly this is very convenient. One has less to learn when one is merely a geologist or when one has only to learn about stones. Yes, but such knowledge is useless when one wants to *do* something for a man. When he is ill, one must understand the whole of Nature. It is useless merely to understand geology or botany or chemistry. One

must understand chemistry and be able to follow its working right into the sap. It is really so. Students have a saying — there are in universities, as you perhaps know, both ordinary and extraordinary professors — and the students have a saying: the ordinary professors know nothing extraordinary, and the extraordinary professors know nothing ordinary! But one can go still further to-day. The geologist knows nothing of plants or animals or men; the anthropologist knows nothing of animals, or plants, or the earth. Neither knows really how the things upon which he works are connected. Just as man has specialised in work, he has specialised in knowledge. And that is much more dangerous. It is shocking when there are only geologists, botanists, etc., so that all knowledge is split up. This has been for men's convenience. People say to-day: a man can't know everything. Well, if one doesn't wish to take in all knowledge, one can despair of any really useful knowledge.

We live at a time when things have assumed a frightful aspect. It is as if a man who has to do with clocks wants to learn only how to file metals, another how to weld them. And there would be another, who knows how to put the clock together, but doesn't know how to work the single metals. Now one can get a certain distance in this way with machinery, although at the same time a certain amount of compulsion is necessary. But in Medicine nothing can be achieved if one does not take into account all branches of

knowledge, even the knowledge of the earth. For in the tree trunk lives something which is carried up from the earth (which is the subject of geology) to the sap. There it dies. One must also know meteorology, the science of air, because from the surrounding air something is brought to the leaves which calls forth life in them again. And one must also know astrology, the science of the stars, if one wishes to understand the formation of cambium. And one must also know what enters with the cambium in the food. … So that when one eats unsound cambium as a child, one gets an unsound brain. In this way diseases are caused by what is in the earth. This is what can be said about the causes of such apparently inexplicable diseases: the causes are in the soil.

6. Poisonous Substances and Their Effects

I have told you that man must be regarded as a being who consists not only of the physical body that is visible to the eye, but also of higher members — invisible bodies. The first invisible member, the ether body, is a much finer, more delicate body and cannot be perceived by the ordinary senses. It is the source of *life* not only in man, but also in the plants and animals. Another higher member is the astral body which enables man to have feelings and perceptions. He has this body in common with the animals, for they too have an astral body. But man has something which the animal has not, namely, self-consciousness, “I” consciousness. Man, then, consists of the visible physical body and of three higher members: ether body, astral body and the “I.”

When it is said, as the result of super-sensible perception, that these higher members are a reality in man, a good way of convincing oneself that such a statement is well-founded — there are other ways too, of course — is to study the effects of poisonous substances upon the human organism.

In speaking about the insects recently, we heard that in certain circumstances insect poison can have an extremely beneficial effect, that it actually counteracts certain illnesses. Most medicaments, indeed, are prepared from substances which, in the ordinary way, are poisons. They must, of course, be taken in the proper dosage, that is to say, they must be

prepared as medicaments in such a way that they have the *right* effect upon the human organism.

Every poison has its own specific way of working. Arsenic is sometimes used to destroy rats and is a very strong poison. When a human being takes arsenic, or when arsenic is given to an animal, death either occurs immediately or if, by administering the appropriate antidote one succeeds in warding off death by expelling the arsenic, a kind of slow arsenical illness may set in and become gradually worse. If in his occupation a man is handling something of which arsenic is an ingredient, these tiny quantities of arsenic may give rise to arsenical poisoning as an occupational disease. When a man takes arsenic in a quantity insufficient to cause death, when he takes only a little but nevertheless enough to be injurious, then he gets pale and thin, has a chalky look about him and his body gradually deteriorates. He loses the natural freshness of his complexion and also the fatness that denotes a healthy state of the body. And so even if the effect of the arsenic is slow, the body gradually deteriorates.

But there is another side to the matter. There are valleys in the Austrian Alps, for example, where the stones and rocks contain arsenic. The people living there begin by taking tiny quantities of arsenic without any ill effects at all. They begin with minute quantities and then increase them — with the strange result that after some time their bodies can stand a

considerable amount. Why do they take the arsenic? In most cases it is for reasons of vanity! They have an idea that the arsenic will give the skin a good colour; if they were once skinny and emaciated they get plump. They take the arsenic for vanity's sake, their bodies get accustomed to it and their complexions improve.

There you have a very striking contradiction! Such contradictions are to be found not only in human thinking — which as a rule is full of them — but in nature too. At one time the effect of the arsenic is that a man wastes away and his skin (not his hair) gets grey. Yet at another time arsenic is taken for the very purpose of improving the complexion! It is a complete contradiction.

What is the explanation? When science speaks of matters like this, we are told: There is no explanation, it simply is so. And indeed it cannot be explained if nothing is known about the super-sensible bodies of man! As I have told you, it is necessary for the human being to have formic acid in him all the time — and the same applies to arsenic. Man actually produces it in his own organism. This may seem surprising, but as I said to you once, it is not correct to state that a man can live without alcohol. He can, of course, live without *drinking* alcohol … but without alcohol he cannot live. For even if he drinks no alcohol, his own body produces inwardly the quantity that is necessary to keep him alive. He produces

in himself all the substances that are essential to his life. What he takes or receives from outside is merely a support, a stimulus. In reality, man himself produces the substances he needs, drawing them from the Cosmos into his organism. All such substances are present in the Cosmos in a state of fine and very delicate distribution — iron, for example, Man does not only take in the iron with his breathing; it also makes its way into the body through the eyes and ears. The iron that a man actually consumes is merely a support, a supplement, and most of it is subsequently excreted. If as human beings we were not obliged to live on the earth between birth and death and to cope with earthly affairs, it would be unnecessary for us to eat at all, for we could draw our sustenance from the universe. But when we have manual work to do, when we have to move about, we need the support of this extra iron, for the body itself does not produce a sufficient quantity.

Man produces arsenic in his organism all the time; so does the animal. The plant does not. And why? Because the plant has only an ether body and it is the *astral body* that produces arsenic. Man and animal, therefore, produce arsenic inwardly. Now what is the purpose of the arsenic? You see, if man were not able to produce arsenic in his organism, he would be incapable of feeling or perception; he would gradually lapse into a plant-like existence. He would begin, first of all, to be dreamy, and finally, he would go about in a state of utter

drowsiness. The arsenic in his organism enables him to be wide-awake, to have feelings and perceptions. When I press my hand on something I not only squeeze the skin but I also *feel* something. And the reason why this feeling arises is that my astral body is producing arsenic all the time.

A man who takes arsenic strengthens the activity of the astral body. The consequence is that the astral body asserts itself all over the organism; it becomes excessively strong, seizes hold of all the organs and rots them away. That is what happens in rapid arsenical poisoning. If anyone takes a great deal of arsenic all at once, the astral body begins to be powerful to an alarming degree; it surges and swirls and finally destroys the activity of the whole organism. It drives the *life* out of the organs, for within the human being a perpetual battle is and must be in process between the astral body and the ether body. The ether body gives *life*; the astral body gives *feeling*, *perception* (awareness). But feeling and awareness cannot arise unless the life is suppressed. There is perpetual battle between the astral body and the ether body. If the ether body has the upper hand we become a little sleepy; if the astral body has the upper hand we become intensely wide-awake. Actually these conditions alternate in waking life, only the alternation is so rapid that it is not noticed and we think we are wide-awake all the time. In reality there is a constant swing: waking, sleeping; waking, sleeping. And what the astral body needs in order to be able to work down in

the right way is provided by the amount of arsenic produced inwardly by the human being himself.

If arsenic is introduced from outside in excessive quantity, the astral body becomes suddenly very strong — so strong that it destroys the life in the ether body. The man can no longer live; he dies.

But if someone takes an amount of arsenic which makes the astral body only a little too strong, then the limbs and the inner organs gradually lose flesh and the man gets thin and has a greyish complexion, because the inner organs are not functioning in the right way. If he is given a very tiny quantity of arsenic, or if he is in the habit of taking such a quantity himself (in the latter case one will not give him any more because he is taking it already) then the astral body begins to be just a little lively; it stimulates the organs and the effect is just the reverse. If, from the beginning, too much arsenic has been given, the astral body destroys the organs; if only a little is given, the organs are stimulated just as they are stimulated by spice. If the dose is increased very gradually, the organs are able to stand it. The man begins to look healthier, to put on flesh, because his astral body is more active than it was before, when he was taking no arsenic.

But now think of someone who was once in the habit of taking arsenic and then is obliged to stop. In such a case his

astral body ceases to be active, because the stimulus given by the arsenic is missing. The result will be a rapid deterioration in his health. And so a person who begins to take arsenic and then increases the doses to a certain point, becomes dependent upon it and must continue to take it until his death. That is where the mischief lies: the arsenic cannot be dispensed with and such people are dependent upon it all their lives. The only other possible course — unfortunately it very seldom succeeds — would be to take less and less by gradual degrees. But what usually happens is the story all over again of the peasant who thought that by applying this theory he would get an ox out of the habit of eating. He gave the ox less and less fodder and although it became very thin, it went on living; finally he gave it a single stalk, and then it died. Nevertheless the peasant was still convinced that if the ox had been able to do without this last stalk, it would still be alive. It is just the same with people who are supposed to be getting rid of the habit of taking arsenic. They collapse before they reach the point of being able to do without the final quantity.

Man’s astral body needs arsenic and it is remarkable to see science groping its way about — for that is what is happening! We constantly hear, for example, that somewhere or other a remedy for syphilis has been discovered. You may have read in the newspapers a few days ago that a remedy for syphilis has been discovered in Paris. Now none of those who make

these tentative experiments really know to what syphilis is due. Syphilis is due to the fact that the physical body has become excessively active and the astral body cannot take hold of it. But the scientists concerned do not know this and so they try things out experimentally Strangely enough, all these medicaments contain arsenic! If you go into the matter you will find that this is the case, although these things can only be explained by Spiritual Science. Arsenic is an ingredient of all these remedies, but the essentials are not known and people are groping in the dark. In many ways this is characteristic of modern science. It is realised, of course, that something happens in the human being when a medicament containing arsenic is administered; but what is not known is that the activity of the astral body is enhanced and that the excessive activity of the physical body is reduced by the administration of a solution of arsenic. Real insight into the nature of man — that is what a new science of medicine must help to promote; for then and only then will healing in the true sense of the word be possible.

And now to return to the subject of poisonous substances in general. There are mineral poisons, one of which is arsenic; copper, lead, phosphorus, tartar emetic, certain pulverised stones — these are all mineral poisons.

There are also plant poisons, for example, belladonna; also digitalis which comes from the red foxglove.

Thirdly, there are animal poisons — insect poisons, snake poisons. These include the very terrible poison of rabies, coming from a mad dog.

Distinction must therefore be made between mineral poisons, plant poisons and animal poisons. Each of them has a different effect. Take, for example, mineral substances like lead or copper — they all have poisonous effects; or sulphuric acid, nitric acid, phosphorus, etc. Such poisons can really only be studied when they have not been taken in quantities sufficient to cause immediate death. A strong dose of mineral poison kills the human being; weaker doses make him ill. And the most important thing of all is to be able accurately to observe how strong the effect of a poison must be to make a man ill. It is when the effects are only slight that we can best study how the poison works. And if illness is present, the right dose may succeed in restoring health.

When a man has taken a mineral poison — let us say, arsenic, or copper, or lead — the symptoms are severe nausea, retching, vomiting, pain in the stomach, violent colic and pains in the intestines. The human body tries all the time only to take in substances that it can really absorb and digest. That is why there is retching and vomiting the moment a man has taken a mineral poison. This is the self-defence put up by the body, but in most cases it is inadequate and then antidotes must be administered; we must see to it that an

antidote with which the poison unites is introduced into the stomach and the intestines. If the poison gets into the stomach and the intestines, it takes hold of the body. But if an antidote is administered, poison and antidote unite and then the poison does not take hold of the body because it has wedded itself, so to speak, with the antidote. And then a strong emetic or purgative must be given.

What are the antidotes for slight mineral poisonings? Discussion of severe poisonings must, of course, be confined to medical circles. In cases of slight mineral poisoning a good antidote is immediately to swallow lukewarm water into which an egg has been beaten; in this way, *fluid albumen* reaches the stomach and the intestines. The poison unites with this fluid albumen and can be got rid of by vomiting or diarrhoea. When the poisoning is very slight, the same result can be achieved with tepid milk or also with certain oils extracted from plants. These are antidotes for mineral poisons — with the exception of *phosphorus* poisoning. If someone has been poisoned with phosphorus, plant-oils must *not* be given because they actually enhance the poisonous effect of the phosphorus. But all other mineral substances can be made to unite with oils, and then expelled.

What actually happens when there is poison in the stomach? Think of what I have just said. An egg has been beaten into lukewarm water and this surrounds the poison in

the stomach. All the poisons I have named are also produced by the human organism itself. The human organism produces in itself a little lead, copper, phosphorus. Man produces within his organism all kinds of substances, but these substances must be produced in exactly the quantity required by the body. If lead is introduced, the body then contains too much lead. So we must ask: What is the function of lead in the human organism? If the body produced no lead, we should all be going about with rickets! Our bones would be flabby and soft. A rachitic child is one whose organism produces too little lead. The human body must contain neither too much nor too little lead. As a general rule the constitution of man is such that he produces the substances he needs in sufficient quantities. If he does not produce them he gets ill. Very well, then, if lead is introduced into the organism, what happens? What happens to the lead that man produces inwardly all the time? Just think of it. Even in childhood you begin to produce lead in your bodies. But lead can really never be found in the body in any perceptible quantity because it is immediately sweated out. If it were not sweated out, you would, as quite young children, have within you so much lead that its presence could be demonstrated; and as grown-ups, far from having soft bones, you would be going about with bones so hard and brittle that if knocked at any point they would fall to pieces. And so this tiny quantity of lead which the human being has within him, is all the time being produced and then sweated out. But if an excessive quantity finds its way into the

body, it cannot immediately be sweated out again and it becomes a destructive agent. Very well — now we give water containing albumen. This is a deterrent to the injurious effects of the lead. And why? The reason why I am unable to sweat out the lead I have myself produced is that I also have albumen in my body. And when a baby is drinking the lukewarm mother's milk, one of the effects of this milk is that the child gets accustomed to sweat out the lead. Therefore lukewarm milk can also be given in a case of slight lead poisoning, and then the lead is induced to leave the body, either through vomiting or through sweating. The very last vestiges must always be got rid of by sweating.

So you see, man imitates what nature is doing all the time. The albumen that is always present in the human being dissolves the lead. If, therefore, I introduce too much lead into the stomach and then add albumen, I am really doing what the body is doing all the time. The effects of these mineral poisons must be nullified by something that contains *life*. It must always be something that has life, either albumen-water — the egg comes from the hen and has life — or lukewarm milk which has come from the cow and has life; or oils that come from the plants and have life. One must give something that contains life, something that still contains etheric life. And so, when there is mineral poisoning, the physical body is cured by means of the *ether body*. In cases of mineral poisoning the physical body is sending its forces with

excessive strength into the ether body. Therefore we can say: mineral poisons cause the physical body to be active in the ether body, to make its way, somewhere in the organs, into the ether body. So you see, if I have too much lead in me and it is not got rid of by its antidote but passes over into the body, then immediately the whole physical body is driven into the ether body. The physical body is a dead body, the ether body is a body of *life*. But the ether body is killed by the physical body when the latter is driven into it with too much force.

If I have copper poisoning and do not at once succeed in rendering it innocuous in the stomach by an antidote, it passes on into the abdomen where the physical body proceeds to make too much headway into the ether body. Again there are injurious effects. All mineral poisons cause the physical body to trespass into the ether body. If I now give the antidote, something that derives from the ether body — albumen water, lukewarm milk and the like — the physical body is driven out of the ether body. Here we can see with exactitude what kind of processes go on in the human body.

And now what is there to say about plant poisons? When the poison is that of belladonna, or henbane, or digitalis, or thorn-apple, or some such plant, the following happens. Mineral poisons cause vomiting; the stomach and intestines are cast into tumult. But when plant poisons have been taken … and taken in large quantities, alcohol and opium too work

as plant poisons … then things do not remain at the stage of nausea or vomiting, but the whole of the body is affected. With plant poisoning, hardly anything, to begin with, happens in the stomach, but lower down, in the intestines, diarrhoea sets in. Whereas mineral poisons give rise more to vomiting, plant poisons give rise more to diarrhoea, but there are further effects. The body swells up, becomes bluish, cramps and convulsions occur; the pupil of the eye expands, or it may also contract, as in opium poisoning, when it becomes tiny; in cases of other plant poisons the pupil is very much enlarged. These plant poisons take a deeper hold of the body. Mineral poisons only take hold of the physical body; plant poisons, because they derive from *life*, from ether substance, take hold of the ether body. And so we may say: plant poisons cause the ether body to trespass into the astral body. The process goes still more deeply into the body. Whereas mineral poisons drive the physical body at some point into the ether body, into the realm of life, plant poisons drive the *life* into the *astral body* — the realm of feeling, of perception. The consequence is that the person concerned is stupefied, feeling is dulled and deadened and the eyes, the very organs through which he is able to have fine and delicate perceptions, are attacked; the pupils enlarge or contract; the skin which is the organ of touch, is affected. Plant poisonings, you see, go more deeply into the body. And now, just as mineral poison is driven out of the ether body by something that derives from *life*, we must discover how the plant poison may be thrown out of the astral

body. And there we must turn to plants in which the astral forces from the *Cosmos*, from the universe, have already taken hold.

The ordinary plants grow in the spring, last through the summer, wither away in the autumn. But think of *trees*: they do not wither away but live for a long, long time. That is because the astral forces come to them from outside and take a hold. In certain trees, this process is particularly strong; such trees do not, of course, become animals, for the plant-nature always predominates; but the astral forces take a very strong hold, particularly in the *bark*. Trees surround themselves with bark and the bark of *oaks* and *willows* is the most potent because it is there that the astral forces have taken the strongest hold. But all trees containing tannic acid, as it is called, are trees in which the astral forces have taken a strong hold. Consequently the juice that can be squeezed or extracted by boiling from the bark of willows or oaks is a useful antidote because with it one can drive out of the astral body what has trespassed into it through the plant poison. To a certain extent, too, both coffee and tea contain an acid of the kind that will help to expel the injurious agent from the astral body. Strong coffee and really good tea also have a counteracting effect upon plant poisons. We can see now that to drink black coffee with our meals is by no means a bad thing to do. Plants always contain poison in tiny quantities and when we drink black coffee we drive out of the astral body the

injurious effects caused by the encroachment of the ether body. And this drinking of black coffee really means that every time we have introduced into the body something that makes it a little unhealthy, we get rid of what was contained in the food and has made too much headway into the astral body.

The right time to drink tea is *during* the taking of food because it actually works more strongly then and takes the astral body in hand. If tea is drunk during a meal it mingles with the digestive process and promotes digestion in that it frees the astral body which is occupied with the digestion. But if tea is drunk some time after a meal, it goes directly to the astral body and makes it too lively, too forceful.

Humanity has had a certain very sound instinct. The habit of drinking coffee fulfils a useful purpose, for it helps the astral body to extricate itself from what may be an injurious element. The body always has a slight tendency to develop poisons and for that reason man needs the weak antidotes contained in coffee. You know, too, that there are people who try to give a fillip to their digestion not only with black coffee but by adding a little brandy to the coffee. In the brandy itself there is something that works as a plant poison and this makes the astral body inoperative. The ether body becomes particularly strong when a man drinks brandy or any spirit of that kind. He feels comfortable, because he lets consciousness slip away he vegetates. When he imbibes strong spirits he lets himself

sink into a plant-like condition and he has the feeling of comfort and well-being that is usually associated with sleep. In sleep, however, he has no consciousness of this well-being. If anyone were actually to feel a sense of wellbeing during sleep it would be because he is aware of the activity of the flesh. But in the ordinary way, when people are asleep they are unconscious of comfort or well-being. When they drink brandy it is a different matter because although they are awake the lower part of the body is sleepy, and in this condition, while the head is awake, they feel extremely comfortable. And so the drinking of spirits promotes a sense of animal-plant-like well-being in man.

Thirdly, there are the animal poisons: snake poison, different insect poisons, also poisons like that produced in a dog with rabies. Snake poisoning provides the best illustration here. If you are bitten by a snake, the poison goes into the blood where it does untold harm. But if you were to extract the poison from snakes and mix it with pepper or salt into food … only that would be a senseless thing to do because snake poison has no taste … I mean, if you were to do such a thing for amusement, your stomach would not be seriously affected! In the stomach it does not act as a poison. The same applies to other animal poisons, insect poisons, for example. But the poison of rabies gets into the saliva and from the saliva into the blood and therefore if it did get into the stomach it would have certain injurious effects, although nothing like as

injurious as the poison from the bite of a mad dog. Rabies poison passes from the saliva into the blood. Speaking quite generally, therefore, it can be said that animal poisons work primarily in the blood, not in the digestive process.

When digestion begins, the in-taken foodstuffs pass, first of all, into the stomach — they are still physical, just as they were in the world outside. Plant poisons derive from the ether body and therefore are not entirely physical; they go more deeply into the body. All foodstuffs eventually reach the blood. Snake poison can be digested and when it passes from the digestion into the blood there are no ill effects. Now when food is in the stomach, the *physical body* is at work. When the food has reached the intestines, from then until the point where it is to pass into the blood, the *ether body* is at work; and the actual transition into the blood is brought about by the *astral body*. But within the blood, the Ego, the “I” is working. If, therefore, snake poison enters the blood, this causes the astral body to trespass into the field of the “I.” The effect of mineral poisons is that the physical body trespasses into the ether body. Plant poisons cause the ether body to trespass into the astral body. Animal poisons cause the astral body to trespass into the field of the “I.” Therefore with an animal poison the only thing to do is to expel it from the blood itself; because the “I” is the highest principle. The poison can only be expelled by something that is actually in the blood. In a case of rabies poisoning, therefore, the only thing to do is to

take an animal and inject the poison into its blood. If the animal dies … well, the poison is the cause of death; but if it does not die, then its blood is strong enough to fight this poison. If the serum is then extracted and injected into a human being who has rabies, something that is capable of fighting the poison is added to his blood and in this way one may possibly succeed in curing him This poison can only be got rid of by the direct antidote, produced in the blood itself. This sheds light on animal poisons in general. The human being himself produces slight animal poisons all the time. The faculties possessed by animals are due to the fact that they produce these poisons in themselves; if they did not, they would have no intelligence at all. The human being produces poisons -very similar to the animal poisons, especially in organs situated near the head — but again in tiny quantities of which the body can make use. If the poisons are produced too vigorously there may, of course, be an excess of such animal poisons in the organism. This is what happens, for example, in diphtheria. Diphtheria is caused by animal poisons which have been produced by the human being himself. Therefore diphtheria can be cured in a similar way — by injecting the poison into an animal who can resist it and then injecting the serum again into the human being. He then has in his blood something that can fight the poison.

This shows you that in nature there are not only useful but also injurious substances … those that are injurious, however,

also have their function. Mineral poisons are the same, essentially, as that with which, in a less potent form, man's ether body has to be dealing all the time. Plant poisons are the same as that with which the astral body has to be dealing all the time; and animal poisons are the same as that with which the "I" has to be dealing all the time. We can therefore say: Poisoning is going on in some degree all the time a man is awake — while he is asleep too — but this poisoning contains its own antidotes. The gist of the matter is that poisons and non-poisons alike must be present in nature in order that the whole economy of nature may go forward in the right way.

Now you will realise why I said (in a previous lecture) that the presence of *formic acid* is indispensable. Formic acid is being sent out into nature all the time from the ant-hills. Formic acid is present everywhere. The human being produces his formic acid himself, but nature needs the ants who produce and send out the formic acid. And if this formic acid were not produced, our earth could never be revitalised — it would simply die away.

In a human corpse there is a poison known as the virus of dead bodies. But in reality man has around him all the time a corpse that is producing poison. A corpse yields this particular virus and the physical body of a living man yields it too, but in the latter case the ether body, astral body and "I" are at work.

These higher members are occupied all the time with this nascent poison; they absorb it as sustenance. If the corpse did not contain poison the living human being would not, in the real sense, be *man*. You will realise from this that when a man dies, something must have gone away from him, namely, the super-sensible members of his being. When the super-sensible members have departed, the poison is no longer destroyed; it remains. If, therefore, people were able to think correctly about why corpse-virus arises, they would say: the physical body has always produced this poison; there is no possible reason why it should not do so, for *as* physical body it is the same, no matter whether the man is dead or alive. But the *super-sensible man* who needs the poison for sustenance, has departed, and therefore the poison remains. This indicates how the super-sensible man is incorporated in the physical, in the material man. Modern science, however, for lack of proper thinking, cannot grasp it.

That, then, is what observation of the way in which poisons work can teach us as a general principle. It also shows us that when we are looking for a medicament in a case of illness, we must ask ourselves: How, exactly, does it work? If we notice that the astral body cannot work as it ought, is not in proper control of the physical and etheric bodies, it is necessary, in certain circumstances, to give the person a very tiny quantity of arsenic because that strengthens the astral body. If the “I” is not working properly, gout or rheumatism appear, because

the “I” is too weak to dissolve the foodstuffs and then they make their way into the blood as foreign bodies. If in a case of gout or rheumatism we discover that this is what is happening, we must proceed to strengthen the “I.” This can be done by administering the right dose of insect poison. If a man is stung by a bee the same thing is achieved in a natural way and he may be cured.

In order to acquire a real knowledge of medicaments or remedies, we must ask: How does nature work upon the “I”? How does nature work upon the astral body? How does nature work upon the ether body? It is precisely by understanding *super-sensible* nature that we develop a knowledge of medicaments.

So you see, science in any domain really depends upon recognition of the super-sensible being of man.